Framework for strategising in business ecosystems

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ABSTRACT

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Business ecosystems have been studied for almost 30 years, having its origin in Moore's theories that he developed in the early 1990's. A business ecosystem is a organisational structure of companies, customers, governmental institutions and other stakeholders included in the process to improve the final value proposition for the end user through cooperation with their competitors.

The complexity of the business ecosystem makes it difficult for a company to comprehend it, and hence also difficult to analyse it, let alone strategise to reach a better competitive position in it. This thesis aims to clarify the configuration of a business ecosystem as a concept and suggests a framework to support the managerial strategising process. The framework is a collection of familiar managerial tools introduced in the ecosystem setting.

The framework has been assembled based on a detailed literature review and together with interviews with business strategy consultants, a working process has been developed.

Keywords: business ecosystem, strategy, dynamic capability, macro-economic environment, alignment risks, competitive advantage

ABSTRAKT

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Affärsekosystem har undersökts i 30 år, och har sitt ursprung i Moores teorier från början av 1990-talet. Ett affärsekosystem är en struktur av organisationer så som företag, kunder, statliga institutioner och andra intressenter som är involverade i att förbättra det slutliga värdeerbjudandet till slutkunden genom att samarbeta med sina konkurrenter.

Komplexiteten i affärsekosystem gör det svårt att greppa dem, och detta gör det svårt att analysera dem. Formulering av en konkret strategi för hur man ska nå en mer konkurrenskraftig position i ekosystemet är därmed också ytterst komplicerad. Det här diplomarbetet strävar till att klargöra ekosystemets uppbyggnad, samt att sammanföra ett ramverk som affärsledare kan använda i sin strategiska planering. Ramverket är en samling av välkända ledningstekniker anpassade till ekosystemsteorierna.

Ramverket är ihopsamlat baserat på en noggrann litteraturstudie, och tillsammans med resultaten från intervjuer med konsulter inom området, har en arbetsprocess tagits fram.

Nyckelbegrepp: affärsekosystem, strategi, dynamisk förmåga, makroekonomisk miljö, risker i allianser, konkurrensfördel

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Amanda Pettersson

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ABBREVIATIONS

B2B (Business-to-Business)

EPM (Ecosystem Pie Model)

EVP (Ecosystem Value Proposition)

JIT (just-in-time)

MSW (municipal solid waste)

PEST (Political, Economic, Socio-cultural, Technological)

R&D (research and development)

ROI (return on investment)

SME (Small- and Medium-sized Enterprise)

TCI (Team Climate Inventory)

TEQ (toxic equivalency)

VRIO (Valuable, Rare, Imperfectly imitable, systematically used by the Organisation)

W2E (Waste-to-Energy)

1 INTRODUCTION

The business ecosystem is a rather novel view on how companies collaborate in order to fulfil the customers' needs. Moore (1993) introduced the concept to fill a gap in the previous research. He noticed that even the largest companies highly depend on collaboration with other actors, and that their competitiveness is not only defined by their offering, but also by their embeddedness into a system of value propositions of other business actors. Hence, he drew the parallel with the biological ecosystems, where species depend on each other, and where the extinction of one species can lead to death of a whole ecosystem. One ecosystem can also be replaced by another if the environment changes or a new species is introduced.

After Moore made the analogy between the biological ecosystem and a business ecosystem in 1993, the topic has been increasingly researched (Adner, 2017; Iansiti & Levien, 2004; Kapoor, 2018; Zott & Amit, 2010). Different views on the structure of the business ecosystem have evolved, and a number of strategising frameworks have been developed to support managers in the strategising process in the context of complex business ecosystems (Rong, Hu, Lin, Shi, & Guo, 2015; Talmar, Walrave, Podoynitsyna, Holmström, & Romme, 2018; Tsvetkova, Nokelainen, Gustafsson, & Eriksson, 2017). However, these frameworks remain mainly on a theoretical and macro level, without a concrete process on company level to follow (Tsvetkova et al., 2017). Managers have difficulties implementing the advice provided by researchers since the business ecosystem is a versatile coalition without clear boundaries.

This thesis will try to fill this gap by answering the following research questions:

- What data should the company collect to analyse their current and future ecosystem as well as the company's strategic position in the business ecosystem?
- How can the company use collected data to maintain or improve their strategic position?

Initially, an extensive literature review on business ecosystems is carried out. The theories are explained, clarifying the versatile nature of the business ecosystem. A framework is then developed based on strategising tools that have been chosen supported by business ecosystem theories.

The framework is a concrete process assembled to help managers of companies trying to enter or initiate a business ecosystem or improve their position in their existing business ecosystem. It should be mentioned that the process is highly iterative and require constant follow-up on the progress. Even though the process is described as steps followed by each other, the steps might also be more successfully completed in a different order or even simultaneously.

Due to the short research period, the framework is conceptual. It is based on theoretical guidelines and a retrospective analysis of a company case, which helped to refine and improve the framework. The detailed case analysis has been, however, excluded from the work for confidentiality reasons. Further research is needed to validate the framework and assess its applicability in other empirical cases. The framework in this thesis could be seen as primary guidelines or a to-do list that supports the novel strategising process of managers interested in understanding and managing their position in business ecosystems.

2 METHODOLOGY

Saunders, Thornhill & Lewis (2016) define research as " . . . a process that people undertake in a systematic way in order to find out things, thereby increasing their knowledge" (p. 5). This thesis conducts research in order to discover how to define a concrete process for managers that are strategising in business ecosystems. This research is done by looking at both primary and secondary data.

It has been debated how management research can fill both the theoretical need to methodically explain the business environment while at the same time being useful for managers in a practical way (Saunders et al., 2016). Rousseau (2006, referred to in (Saunders et al., 2016), pp. 7-8) tried to close this 'research-practice gap' by examining research results and translating these into practical management practices. This is called 'evidence-based management', and its opposite management practice is to follow the intuition of the leader. (Saunders et al., 2016) This thesis focuses on connecting the academic research done about business ecosystems with tools that are well known by managers, in order to make the business ecosystem theories more applicable for managers. In other words, this thesis is based on applied research and therefore it contributes to the evidence-based management field.

As already mentioned, both primary and secondary data has been used in this thesis. The primary data has been collected through interviews and brainstorming. The secondary data has been collected through a semi-systematic literature review and case analysis.

All research should proceed from existing knowledge that has previously been collected about the topic. The literature review studies and organises concepts in the existing literature. This facilitates the process of discovering areas that would require further research. The literature review also establishes a broad understanding of the research topic and distinguishes key concepts. The core in a literature review should consist of articles from scholarly and/or research journals, and another source of references is review articles. Another good source of information is books written about the topic. (Rowley & Slack, 2004) The research process started with studying a few renowned articles about business ecosystems. The authors of these articles refer to other articles and books, and hence the research continued by examining those as

well. This method to find sources of information is called 'the citation pearl growing' (Rowley & Slack, 2004). During the reading process, constant notetaking summarised the wide and complex literature, and concept maps were built to support the conceptualisation of the topic.

Four interviews done with consultants working at PBI Research Institute constituted another important source of information for this thesis. These interviews were conducted by Ph.D. student Yiran Chen (2019) as a part of her dissertation research, and the author of this thesis participated in these interviews as an observer. Therefore, the questions and the answers from the interviews are excluded from this thesis, and only some of the key takeaways are mentioned. The interviews were semi-structured and they were conducted face-to-face and one-on-one (if excluding the observing thesis author). These interviews were then qualitatively analysed and discussed during brainstorming sessions with researchers in the field to conclude the output. This output has then been used as primary data for this thesis. Due to the issues of bias, cultural differences, reliability and generalisability that occur during semi-structured interviews (Saunders et al., 2016), the author of this thesis has attempted to support the statements of the interviewees with secondary material.

Some insight for the framework was also gathered through so-called practise-based design. By reviewing PBI Research Institute's customer cases, the thesis author gained insight into management consultancy practices. This was supportive when formulating the framework. A specific customer case that PBI has been working on analyses the customer's possibilities to enter a new geographical market, and this analysis has been done considering the business ecosystem the company should enter when introducing its offering in that market. This case has been closely analysed to increase the understanding of the working process when entering a business ecosystem. However, due to confidentiality reasons the analysis has been left out from this thesis.

3 LITERATURE REVIEW

3.1 WHY BUSINESS ECOSYSTEMS?

Due to the increasing complexity of gaining competitive advantage in today's business world, a new view on how different companies should strategise to sustain their position has been developed. A single firm seldomly has all the needed capabilities and resources to remain competitive. The business ecosystem is an alignment structure of multilateral actors participating in the value creation process. This introduces an opportunity to enrich the value proposition towards the customers and other end users. (Adner, 2017; Iansiti & Levien, 2004; Moore, 1996; Talmar et al., 2018)

To emphasise the added value of the business ecosystem theory, two traditional views on business strategising, value chain and supply chain perspectives, are presented in this chapter. The value chain perspective views the strategising process from the focal company's perspective. The view defines the competitive advantage of the company as the fit between the internal activities, performed in a sequential chain. (Kapoor, 2018) The activities are divided into two different subcategories: primary activities and support activities. The primary activities include inbound logistics, operations, outbound logistics, marketing and sales, and service. These are the activities producing the value offered to the customer. The support activities in turn, as the name suggests, are the activities supporting the primary activities. These are for example procurement, human resource management and technology development. (Porter, 2001) Porter (2001) has identified the need for an analysis on a higher level than the company's internal activities, but further discussion about the other actors in the value system and their relationships is left out. The value chain perspective gives a micro view of the focal company's activities and their internal fit (Kapoor, 2018). The business ecosystem, however, analyses the business environment from a macro view. This provides the company with a more unified picture of all the actors they need to collaborate with in order to achieve a competitive value proposition.

A supply chain includes the actors directly involved in the flow of inputs and outcomes from a source to the end user. (Kapoor, 2018) There are three degrees of the supply chain complexity: direct supply chain, extended supply chain and ultimate supply chain. Figure 1 depicts the different supply chain complexities. Supply chain

management requires extensive consideration of the relationship between the actors in the chain in order to achieve the ultimate goal, operational excellence. The supply chain theory provides a roadmap for analysing the chain of several companies' value chains. (Mentzer et al., 2001) This is a step towards the business ecosystem from the value chain management theory, but Kapoor (2018) explains the difference between supply chains and business ecosystem as the lack of consideration of the complementarities on the demand side of the focal company. The ecosystem view also illuminates the links between stakeholders that are excluded from the supply chain, like for example the government and the focal company's direct competitors. Once these indirect links are recognised, they are easier to manage (Adner, 2017).

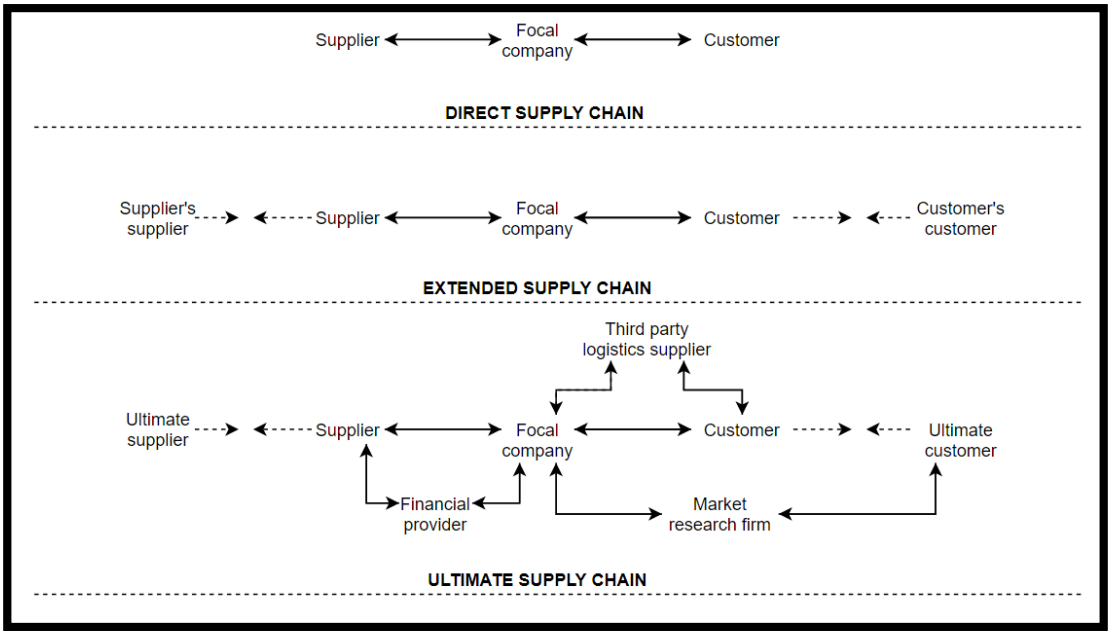


Figure 1. The complexity degrees of a supply chain (Mentzer et al., 2001).

Graça & Camarinha-Matos (2017) have collected a list of benefits of collaboration between companies. These include shared risks, enhanced innovation capacity, shared social responsibility and better possibilities to maintain the market position. The shared risks might, for example, enable SME's to compete with large competitors. Enhanced innovation possibilities will make the final value delivered to the customers better, and hence locking the customer tighter to your value proposition. The shared social responsibility will make actors in a business ecosystem to benefit from altruism. These

are only a small fraction of all the possible advantages that a company might notice while participating in a business ecosystem, and this thesis will hopefully clarify several benefits gained once the whole business ecosystem is analysed within a strategising process.

3.2 BUSINESS ECOSYSTEMS

3.2.1 Definition

The concept of business ecosystem originates from the comparison of the business world to the natural ecosystems. Business strategist James F. Moore (1993) stated the analogy in 1993, when he tried to explain the collaboration pattern of companies that are dependent on each other and how their managers should view their strategising process. He pointed at the fact that in the increasingly globalised and interconnected business world, competition is exercised among business ecosystems rather than among individual companies, and if the managers want their companies to succeed, this fact should not be overlooked.

According to Moore's theory, an ecosystem consists of companies that collaborate towards a common goal (Moore, 1993). This definition is further elaborated by Ron Adner, as he explicates the definition of an ecosystem as ". . . the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize" (Adner, 2017, p. 42). The term 'coopetition' has also been used to explain the ecosystem setting. (Adner, 2017; Scaringella & Radziwon, 2018) Coopetition is a portmanteau, merging the words 'cooperation' and 'competition'. Ritala (2012) defines *coopetition* as the collaboration between competing firms.

The following elements are according to Adner (2017) required in a business ecosystem for a value proposition to form:

1. actors
2. activities
3. positions and
4. links.

The *actors* are the entities performing the direct or indirect *activities* needed for the business ecosystem value proposition to be realised. The actors are *linked* to each other in various partner models and they have specific *positions* in the business ecosystem alignment.

The *actors* can either be companies, organisations or even departments in the companies. An actor might be part of several different ecosystems if they offer various value propositions. They are legally independent but economically interdependent (Talmar et al., 2018). The actors have their own strategies, but every business ecosystem actor should adapt their strategy to the systemic strategy (Tsvetkova et al., 2017).

Activities are the actions that the actors execute and hence contribute to the ecosystem value proposition. An actor most probably performs several activities and having an aligned internal activity process is one element for a company striving for competitive advantage. (Talmar et al., 2018)

Based on the activities and the actors performing them, the actors are *positioned* in the business ecosystem alignment (Talmar et al., 2018). A position of an actor might be improved into a more stable position, or if the actor is underachieving the actor might even loose its position, and hence be excluded from the ecosystem. (Tsvetkova et al., 2017)

The *links* between the actors might include transfers of material, information, influence and funds. (Adner, 2017) The links are strengthened by implementing a partnering process, which increases the trust between the actors. (Crane, Felder, Thompson, Thompson, & Sanders, 1997)

3.2.2 Different kinds of actors in business ecosystems

In Moore's (1996) definition of the business ecosystem, the actors that are included in the ecosystem are the focal company, customers, complementors, suppliers, owners and other stakeholders such as investors, government agencies and regulators, as well as the focal company's direct competitors. All these actors may choose different approaches on how to act in the ecosystem. Iansiti & Levien (2004) use the terms

keystones, *dominators* and *niche players* to define the differences among the strategies that the actors may choose to apply.

Robert T. Paine introduced the term *keystone species* in 1969 (L. Scott Mills, Michael E. Soulé, & Daniel F. Doak, 1993), when he noticed that there are species that are required for remaining the stability of the ecosystem (Paine, 1969). L. Scott Mills et al. (1993) mention two distinguishing features of the keystone species; their presence is fateful for the balance and diversity of the ecosystem, and they are extraordinary compared to other species in the ecosystem. These features are also mentioned by Iansiti & Levien (2004) as the typical attributes of a keystone actor in a business ecosystem.

Directly contrary to the keystone actors are the *dominators* (Iansiti & Levien, 2004). Dominators, or invaders that they are usually called in biological context, reduce the biodiversity and change the processes in the ecosystem (Peter M. Vitousek, Carla M. D'Antonio, Lloyd L. Loope, & Randy Westbrooks, 1996). Iansiti & Levien (2004) note two distinguishing features that the dominators possess compared to the keystones: the physical size of the dominator is usually major towards the keystone's modest presence in the business ecosystem, and dominators are required to cover the functions in an business ecosystem or simply to trade them off while the keystone does anything in its power to incorporate complementing functions.

An ecological niche is the limits of where a biological species can reproduce, and the niche contains all the required assets for a species to flourish (A Townsend Peterson, 2003). The *niche player* flourishes in a constrained part of the business ecosystem, since it can focus on developing its capabilities in a protected and nourishing environment, and so forth brings valuable knowledge into the ecosystem. This in its turn makes the ecosystem dependent on the knowledge provided by the niche player, and the other actors (mainly the keystone) will protect the position of the niche player. (Iansiti & Levien, 2004)

The actor division made by Iansiti & Levien (2004) is based on the ecosystem-as-affiliation (Adner, 2017) view of the business ecosystem, which is an actor-centric approach to describe the ecosystem. Since this thesis focuses on the activity-centric approach, these above-mentioned actor types will not be further analysed, but for the case of understanding the complexity of the business ecosystem, a quick presentation

of the actor types was necessary. The different actor types do however exist in any business ecosystem, it is the point-of-view that the ecosystem analysis takes that differs between the ecosystem-as-affiliation and ecosystem-as-structure approaches. The two different approaches will be further discussed later in the text.

3.2.3 The business ecosystem configuration

The business ecosystem is a loose network of actors, bound together by interdependencies and complementarities. The actors are linked together in an active value creation chain. (Scaringella & Radziwon, 2018) The actors are interdependent, since no single company has all the required assets and capabilities needed to produce a complex value proposition, resulting in a need of collaboration (Talmar et al., 2018). Due to the interdependencies that the business ecosystem is built around, the value creation will be largely affected by bottlenecks in the value chain. These bottlenecks and their impact on the firms should be closely analysed in the ecosystem. (Kapoor, 2018)

> *The interdependencies are the crucial links between the actors on the supply-side in the ecosystem, the link between the focal company and its suppliers and customers. The complementarities are the activities that enhance the perceived value of the offering, usually the links on the demand-side of the value chain. (Kapoor, 2018) To clarify the differences between the interdependencies and the complementarities, an example from the energy industry is provided (see*

Figure 2). A fossil fuel- driven power plant requires both a combustion engine and fuel in order to be able to produce the needed power. If the power plant (i.e. the customer) acts as the integrator; buying the engine from the engine provider and the fuel from the fuel provider, then the fuel provider and the engine provider are complementors, providing complementarities to each other's offers. However, if the engine provider acts as the integrator by, for example, offering a service to operate the engine on-site, it takes on the responsibility to buy the fuel whenever needed. This entails that the engine provider and the fuel producer are tied in an interdependency.

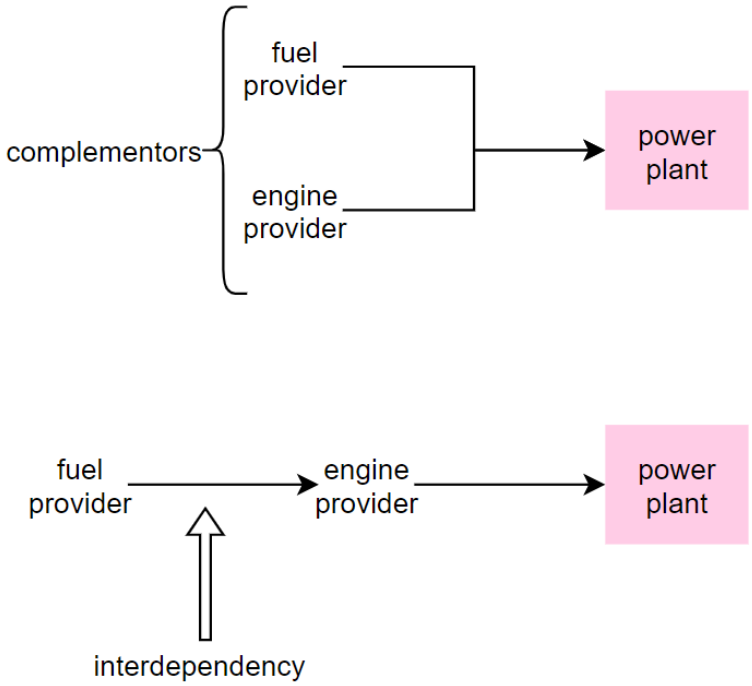


Figure 2. Interdependencies and complementarities (Kapoor, 2018).

An interdependency is fairly easy to handle with traditional managing tools. Buyer-supplier relationships are well managed by e.g. sales functions. The process to manage a complementing actor is not as self-evident, though. Traditionally, companies do not buy from nor sell anything to their complementors. For complementors to produce synchronised offerings, collaboration between the actors is crucial. This can be managed by, for example, mutual R&D investments. (Kapoor, 2018) To return to the energy industry example (

Figure 2), the interdependency between the engine provider and the fuel producer (in the case when the engine provider acts as the integrator) can be managed by e.g. setting up a contract of decreased price on fuel when the same fuel producer has been deployed for a long time. This gives an incentive for both actors to maintain the relationship; the fuel producer has a long-term customer and the engine provider can lower the costs and receive greater profit margins on the service they provide for the power plant. When the power plant acts as the integrator, the fuel producer and the engine provider might not be in any contact with each other. When a business ecosystem analysis is done, the lack of relationship between these actors is noticed, and by rectifying this, the value proposition for the customer (in this case the power plant) can be enhanced. For example if the engine provider and the fuel producer join their forces and try to

develop a bio-based fuel that can be used in the engine, the customer could promote itself as a green power plant, which could bring new end users and greater profits for the power plant.

According to Jacobides, Cennamo & Gawer (2018), the complementarities can be divided into three main groups: *unique*, *generic* and *supermodular* complementarities. A unique complementarity can be either strict or specific. An example of a *strict unique complementarity* would be between an app and a smart phone. The app is useless without the smart phone, and hence, the app provider needs to develop its offering to be applicable on the existing smart phone. Expressed in a more universal manner,

A does not function without B,

where A and B are specific items or activities. For clarity, in the above-mentioned case, the app is A and the smart phone is B. A *specific unique complementarity* could be expressed in the same universal manner as

A is maximised with B.

The same example case could be used to explain this, but now the phone would be A and the app would be B. A smart phone can be used without apps, but the full potential value of the smart phone is not utilised before apps are added to it. Both strict and specific unique complementarities can be one-way or two-way. If the complementarity is one-way, A needs B to function, but B does not need A to function, and if it is two-way the complementarity is mutual. (Jacobides et al., 2018)

The universal description of a *supermodular complementarity* would be as following:

more of A increases the value of B.

Using the same example case as above, the complementarity is a supermodular when A is the app provider and B is the smart phone. If A brings new and improved apps to the market, the value of the smart phone for the end customer will increase further.

A *generic complementarity* is an asset, product or activity that is crucial for the value proposition, but the relationship management does not require any complicated measures. An example of a generic complementarity could be electricity or water. As good as every production process requires these complementarities, but utilising them

brings little concern to the user, and hence, the actors bringing these complementarities to the ecosystem can be left outside the analysis limits. (Jacobides et al., 2018)

After this description of the different complementarity types, the definition of the business ecosystem could be updated according to Jacobides et al. (2018):

> *"An ecosystem is a set of actors with varying degrees of multilateral, nongeneric complementarities that are not fully hierarchically controlled."* (Jacobides et al., 2018)

One of the most common critiques towards the business ecosystem theory has been that it is unclear how to set the boundaries for the ecosystem (Adner, 2017). Jacobides et al. (2018) have excluded every actor that provides generic complementarities to the ecosystem. Adner (2017) has also answered the critique about the infinite web of actors that could be included in an ecosystem in a similar way: he defines the ecosystem around the focal value proposition and not the focal company, excluding those actors that can be expected to remain a part of the ecosystem no matter what. While committing an ecosystem analysis, this exclusion of the generic complementors will make the analysis less complicated and easier to grasp.

As already mentioned, bottlenecks affect the value creation process in a business ecosystem largely. A bottleneck is a component in the ecosystem that is of low quality or produced slowly, hence limiting the value creation for the actors that depend on that component. The bottlenecks can situate both downstream and upstream from the focal company, and as Adner & Kapoor (2010) state the location of the bottleneck has different effects on the focal company's business. An ecosystem might contain several bottlenecks at once and the bottlenecks might also change over time. (Hannah & Eisenhardt, 2018; Kapoor, 2018) To clarify what is the bottleneck and its effect on the business ecosystem, a simple example is illustrated.

Consider a shopping mall business ecosystem. The mall consists of several shops, restaurant, cafés and other recreational services. For the mall to gain a good reputation and hence appeal to the larger public, the services in the mall should be great. If the shops always have trouble with their suppliers, the whole mall might suffer since these shops underdeliver, hence making the mall look negligent. The suppliers for the

underdelivering shops are hence a downstream bottleneck for the mall. A bottleneck in a complementing component would be, for example, if the public transport possibilities are poor to the mall. This will limit the customers travelling to and from the mall, making the business for the mall impossible. Once these bottlenecks have been noticed by the mall owner while analysing the business ecosystem, it is possible to rectify these with higher success rate than if the bottlenecks were unknown and only a strict supply chain analysis would be done.

3.2.4 Business ecosystem evolution

The business ecosystem continuously evolves, it should be viewed as a process rather than a snapshot of several interconnected actors (Rong et al., 2015). As Moore (1993) explains, the business ecosystem gradually moves from a state where the actors are unorganised and confused, towards a more structured and target-oriented state. Moore has divided the evolution process into four stages: *birth, expansion, leadership and self-renewal or death*. However, he also reminds that the transition periods are vague and most likely will pass without noticing. (Moore, 1993)

During the ***birth*** stage, the ecosystem value proposition should be set. The work at this stage should be done in a highly collaborative environment, in order to maximise the value proposition. (Moore, 1993) Ethiraj (2007) reasons that the value of a system is greater than the value of the separate components, and this reasoning theoretically also holds for business ecosystems. Even the largest companies highly depend on collaboration with other actors; their competitive advantage is defined by their offering, but also by their embeddedness into a system of value propositions of other business actors. (Moore, 1993) Companies introducing innovations to the market strive to be the initiator in order to capture as much value as possible before the competitors enter the market, but without analysing the other actors in the ecosystem and their capabilities, the introduction of the innovation might fail drastically. (Adner & Kapoor, 2010) How to analyse and tackle the mentioned challenge that might exist in an ecosystem, will be further discussed later in the thesis (see chapter 3.2.6). However, for this paragraph, the fact that collaboration during the birth stage is crucial, is enough.

As the name of the next stage suggests, during the ***expansion*** stage the ecosystem should try to expand and conquer a larger market share. Moore introduces two important attributes that ecosystems at this stage should meet; first, they should have an outstanding value proposition, and second, they should have the ability to fulfil the needs of the market. The greatest challenge during this stage is to find a balance between creating a bigger demand for the offering of the ecosystem, and at the same time controlling the demand so that it does not overrun the ecosystem's production capability. (Moore, 1993) If the demand-side and supply-side of a focal company are uneven, a bottleneck is formed in the ecosystem. This bottleneck will cause a decrease in the productivity of the whole business ecosystem, resulting in discomforts for most of the actors in the ecosystem. Collaboration and openness towards the other actors in the ecosystem are important even at this stage. This challenge will also be further discussed in chapter 3.2.6.

So far, cooperation between the ecosystem actors has been an essential criterion for the evolution of the ecosystem. In the third stage, ***leadership***, the ecosystem evolution becomes slightly more complicated for the single actor; now the competition for the leadership in the ecosystem becomes present. The actors want to have a more stable part in a profitable ecosystem, and being a leader gives some stability, since learning to work with a new leader requires much effort from the other companies. Hence, the followers will enable a good leader to retain its position. To become the leader of an ecosystem, an actor needs to create an interdependence with the ecosystem. This can be achieved by, for example, entering a joint venture with another major actor, by creating a package deal the ecosystem might collapse without, or by being the only practical actor to perform a significant activity in the ecosystem. (Moore, 1993)

The ***self-renewal*** stage becomes unavoidable when new ecosystems threaten the position of the existing one. Also, macroeconomic changes can act as a catalyst for self-renewal of the ecosystem. There are three things an ecosystem can try to implement in order to preserve its position: 1) slow down the emergence of the new ecosystem, 2) introduce new innovations into the ecosystem's offering and 3) renew itself completely. By lobbying for or increasing marketing efforts of the existing solution, the new ecosystem's advancement can be slowed down. In order to introduce new innovations, investments in R&D activities should be made. R&D investments should, however, be carefully considered, because introduction of new activities into

the ecosystem requires actors with the capability to complete the activity. If there are no such actors, renewing the ecosystem structure and culture might be the closest solution. If none of these self-renewal procedures can be followed through, ***death*** of the ecosystem is inevitable. (Moore, 1993)

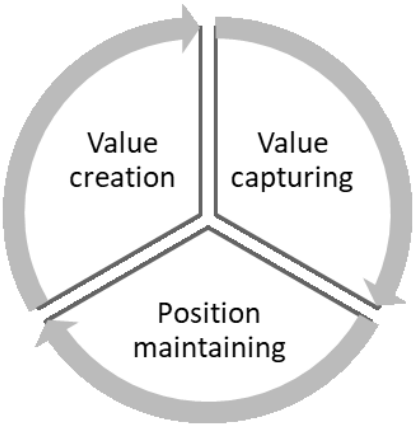


Figure 3. Framework for business ecosystem strategising (Tsvetkova et al., 2017).

Self-renewal is a difficult task. Tsvetkova, Nokelainen, Gustafsson & Eriksson (2017) have introduced a macro-level process on how to elevate the ecosystem. This process has worked as an important source of inspiration for the framework developed in this thesis. The process starts with analysing what the existing ecosystem looks like: who are the involved actors and which tasks are they performing. During this stage of the process, the future business ecosystem should also be imagined. Here it is decided how the *value creation* should be realised. In the second stage, the positions of the different actors in the existing and in the future ecosystems should be evaluated. By deciding the positions of the actors, the share of *value captured* by every actor is defined. In stage three every actor decides by themselves how they implement the ecosystem position provided to them. This is where the single actor has most power to affect the ecosystem and the value proposition, and by doing the right things at this stage the actor increases its possibility to *maintain its position*.

3.2.5 Business ecosystem driving force

A business ecosystem can be viewed from two different perspectives: ecosystem-as-affiliation and ecosystem-as-structure (Adner, 2017). This division depends on which attributes of a business ecosystem are critical for the analysis.

According to Adner (2017), ecosystem-as-affiliation, on the one hand, views the ecosystem as a bundle of companies that are collaborating. Iansiti & Levien's (2004) description of the ecosystem as a network of actors working around the keystone player is a good example of this view. According to this view, the focal company is the keystone of the whole system, the actor that initiates every activity and relationship. In the developing process of an ecosystem with this view, the existing network of actors is the steppingstone. Every strategic decision originates from the existing relationships between the actors, and the ecosystem is accordingly further evolved by including new actors into the community. This view limits the thinking process, making it difficult to think "outside the box" regarding new ways to create value for the end user, since the value proposition is often decided by the focal company, i.e. the keystone actor. (Adner, 2017)

Ecosystem-as-structure, on the other hand, views the ecosystem from the basis of a common value proposition that the actors strive to fulfil (Adner, 2017). By initiating the strategising process from the customer needs and introducing the correct actors to achieve the goal of satisfying the customer at an unexpected level, the odds for finding new ways for value creation are higher. Therefore, the framework developed for this thesis also starts by looking at the customer's, or the end user's, intrinsic needs. The main goal of the ecosystem collaboration is thereby defined; to centralise actors around the value proposition that will maximise the customers' satisfaction level.

3.2.6 Problems with working in a business ecosystem

A business ecosystem collaboration unfortunately also might limit the actors participating in it. Barriers exist in almost every ecosystem, e.g. in the form of norms, regulations and routines. (Tsvetkova et al., 2017) Some actors might be resistant in changing the way they do things or whom they collaborate with, making the whole ecosystem stagnant. Adner (2017) labels this an adoption chain risk; the risk that some

actor is unwilling to undertake the required activity. Other actors might even be unable to perform their tasks, causing bottlenecks. This Adner (2017) labels co-innovation risk. To be able to achieve an improvement, these barriers should be addressed by incentivising even the most adverse actors. The terms should be negotiated so that a win-win situation appears (Tsvetkova, 2014). Pointing on concrete data showing the possibilities enabled by an ecosystem collaboration is an effective measure to convince the opposing actors.

As already mentioned in chapter 3.2.3, bottlenecks limit the results achieved by a business ecosystem. The bottlenecks constrain the value creation both upstream and downstream (Adner & Kapoor, 2010; Kapoor, 2018). Downstream an underachieving direct supplier might obstruct the delivery of a product or service. The upstream bottleneck might occur, for example, if the improved technological solution of one actor makes the solution of the complementor inadequate. For example, in the electronic vehicle ecosystem, an improvement in the charging infrastructure would increase the challenges for the power generators to progress at the same rate as the demand grows (Kapoor, 2018). A business ecosystem analysis sheds light on the actors that should be considered when an improvement possibility is investigated, pointing at the actors or processes that might suspend the positive effects of an improvement. This enables that the possible bottleneck components can be changed or supported to avoid them from becoming real bottlenecks.

The interdependencies in the ecosystem bring many advantages, but they can also be detrimental. An ecosystem is very dependent on the leader or the keystone player (Iansiti & Levien, 2004), and if this actor makes some poor choices it can have disruptive outcomes. For example, if the leader sustains the platform that all the actors are dependent on in their collaboration, a decision from the leader to change the platform might complicate the other actors' communication, which might lead to actors leaving the ecosystem. Hence, the leader, or the keystone player, should be supported by the rest of the actors (Iansiti & Levien, 2004).

3.3 INNOVATION ECOSYSTEMS

The recent research in ecosystems have resulted in various concepts describing similar phenomena. The research referred to in this thesis covers business ecosystems and innovation ecosystems. To be able to use the theories developed under different ecosystem terms, the difference between these terms should be clarified.

Scaringella & Radziwon (2018) have done an extensive systematic literature review to discover how the concepts of different ecosystems deviate from each other. They reach the conclusion that *business ecosystem* is an umbrella term of several ecosystems, and *innovation ecosystem* is one of the subcategories of the business ecosystem.

Innovation ecosystem differ from *business ecosystem* in the way the customer is considered. According to Scaringella & Radziwon (2018), the *innovation ecosystem,* on the one hand, is a network of actors bringing an innovative solution to the market, and once they have released the innovation they try to sell it to the customer. Additionally, the actors in an innovation ecosystem are all aware of them participating in the ecosystem. Business ecosystems, on the other hand, proceed from the knowledge of what value the customers require. The actors in the business ecosystem might be included in the ecosystem without them knowing it. With these being the main differences between the two ecosystems, the majority of the research related to innovation ecosystems can also be applicable for the purpose of this thesis.

4 THE 3I-FRAMEWORK

In today's complex business setting, a good understanding of all the actors affecting your business is of ever greater importance. Competitive advantage builds on knowing how to consolidate profitable ecosystems and understanding how to steer these into a path of continuous improvement (Rubenstein, 2012). A business ecosystem analysis gives a good overview of the multifaceted entity that every company is part of. However, this complicated system might be difficult to grasp, and managers might struggle to see where they should start their analysis and what it should include. The framework developed in this thesis, the 3I-framework, should provide some guidelines to these issues. The framework is a concrete process, using both familiar managerial tools and business ecosystem theories to direct the strategising process on the right track.

It should be mentioned that the 3I-framework should be viewed as a highly iterative process and the process requires constant follow-up on the progress. Even though the process is described as steps followed by each other, the steps might also be more successfully completed in a different order or overlapping each other.

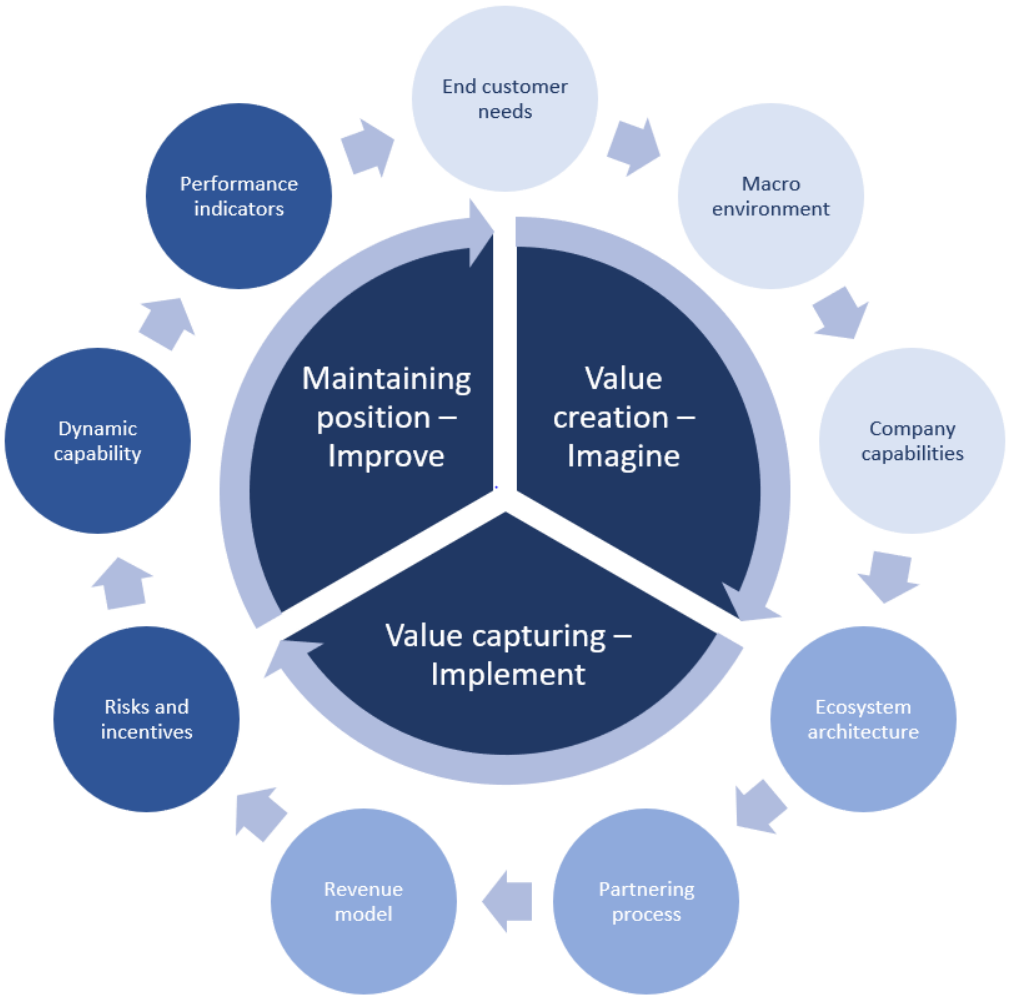


Figure 4. The 3I framework.

Figure 4 shows the 3I-framework in one summarising picture. The basis for the framework are the three evolution steps settled by Tsvetkova et al. (2017): value creation, value capturing and maintaining the position. The value creation phase is when the focal company and possible early partners are Imagining the ecosystem as it will be initiated. The value capturing phase is when the planned ecosystem is Implemented by introducing the other actors to the ecosystem and setting up a collaborative environment. The last phase, the maintain position phase, is when the business ecosystem is Improved through analysing the ecosystem to discover weaknesses and rectifying these. This gives the 3I-framework: *Imagine, Implement and Improve*.

This detailed chapter about the framework describes the important phases in a business ecosystem analysis, and the order of the process steps has been carefully considered. The order of the steps is based on the theory in the article by Tsvetkova et al. (2017) and the framework should be rational to follow. To once again urge on the importance of continuous improvement, it should be mentioned that the 3I-framework provides the best results when used iteratively. The framework will be summarised in a business ecosystem canvas. This canvas can be found on page 71 and refilling it several times will provide the users with a comprehensive view of the ecosystem.

4.1 VALUE CREATION – IMAGINE THE BUSINESS ECOSYSTEM

Deciding how the value should be created in the business ecosystem is the first step of the strategising process (Tsvetkova et al., 2017). In the interviews with the consultants from PBI Research Institute it appeared that the company is unable to capture value without a solid value proposition. (Chen, 2019) This value proposition is developed with the steps in this following chapter.

Even though many of the tools used in the 3I-framework are company-oriented, the supra-organisational work should not be forgotten (Tsvetkova et al., 2017). Collaboration between the early actors in the ecosystem is of highest importance, and regular meetings should be organised to constantly monitor how the work is proceeding.

4.1.1 End customer needs

As mentioned in chapter 4.1, the evolution of the ecosystem starts by designing a value proposition through identifying the goals of the ecosystem. These goals are defined by the needs of the ecosystem actors that pay for the products or services offered by the rest of the ecosystem (Tsvetkova et al., 2017). In order to decide what the value proposition of the ecosystem should be, a deep understanding of the customers/end users and their needs should be gathered. Storbacka et al. (1999, referred to in (Hirvonen & Helander, 2001), p. 282) has argued that by understanding how the customer creates value the supplier can find problems that the customers themselves

are unaware of. According to a consultant at PBI Research Institute, a deep understanding of the customer's customer is also crucial in the field of B2B, since an effective way to formulate a value proposition could be by trying to solve the issues of the customer's customer (Chen, 2019).

Another important factor to consider when contemplating who the possible future customers are, would be to think further than the traditional customer. A clear picture of the business environment could give a hint of user segments that are left out while thinking about the traditional customer. More about the business environment and how to analyse it extensively will be discussed in chapter 4.1.2.

Gathering the needed information about the end user is difficult. Ulwick (2002) implies that companies that appear to work in a customer-driven manner usually gather their knowledge about the customers the wrong way. By asking the customers what they want, the innovation process of the company is forgotten and ignored. Customers answer this question by proposing solutions, but the solutions that they suggest are based on existing solutions. It is the providing ecosystem actors' responsibility to identify new ways to solve the customers' problem. To keep the innovation process as unlimited as possible, the wanted outcome should be requested instead of the wanted solution. This will give the business ecosystem information of what the customers need, giving guidelines without borders for the innovation process. (Ulwick, 2002)

Ulwick (2002) has gathered a process on how to collect information about the customer needs in a outcome-based manner. He commits carefully planned interviews and analyses the outcome in a structured way to identify the needed innovations. The subsequent part of this chapter will clarify Ulwick's process, using a very simplified and fictional example of a watering can producer:

Step 1: Break down the working process in which the product or the service of the company is used (Ulwick, 2002). For our example, the steps are the following: the user needs to fill the watering can with water, transport the water to the pot plant without spilling, pour the water into the pot with a suitable flow (not too fast nor too slow, avoiding the water from spilling over the edges of the pot but still making the watering effective for the customer), and avoid too many refills of the watering can.

Choose the interviewees by categorising the actors that are in direct contact with the product/service (Ulwick, 2002). In our example the different categories could be, for example, private persons (watering only a few plants per time), persons using the can in their profession (e.g. gardeners, florists) or those concerned with the economic issues (for example someone who buys the equipment used by city workers). Within these categories, a diverse set of persons should be chosen for the interviews; male or female, persons from different age groups, persons working in different conditions etc. Make the set of interviewees as broad as possible, but still choose relevant persons, avoiding to include opinions making the interviews difficult to analyse (Ulwick, 2002).

Step 2: Commit the interviews by constantly reminding the interviewees to continue talking about the activities they perform instead of the technical issues. The questions asked could be, for example, what the difficulties using the product/service are, or how they ideally would like to perform the activity. Ensure that all the steps listed in step 1 are covered during the interview but allow the interviewee to talk freely about the topic. The outcome should contain both the type of improvement (increase, decrease) and the unit of the measure (e.g. time, frequency). These measurements are good to keep in mind as possible key performance indices for future monitoring. (Ulwick, 2002)

For our watering can-example, let us pretend that one of the users tells the interviewer that a very time-consuming matter is the need to refill the watering can constantly. This requires a great amount of running between the water tap and the plants, which takes time and makes the user tired. This answer opens several solution possibilities, while if the user would have said that ‘the can is too small’, the innovation possibility would be very limited. At this point, the interviewer rephrases the statement and confirms it with the interviewee to avoid guesses during the analysis stage. For example, this statement made by the user could be rephrased to ‘minimise the time it takes to water the plants’ and ‘minimise the distance to cover by foot’.

Step 3: Now the outcomes should be organised. A successful way to organise the outcomes would be to divide them according to the process steps decided in step 1. (Ulwick, 2002) Going back to our example; with slight changes to the steps, making them more general in order to keep the innovation process as limitless as possible, the categories to divide the outcomes by could be for example: transport the water between

the water tap and the plant, pour the water in a precisely specified spot, and remember to water the plants to keep them from drying. Looking at this collection of data, it should be possible to see how the users measure value (Ulwick, 2002).

Step 4: Once the outcomes are organised and duplicates are removed, a quantitative survey should be made. The customers should rate the outcomes by how important they are and how satisfied they are with the performance of the outcome for the moment. (Ulwick, 2002) See Ulwick's (2002) article on page 6 for more information on the rating system.

Step 5: This is the final step. By looking at the survey results from step 4, the outcomes that are considered most important and are performed with least satisfaction for the moment should be the steppingstones for the innovation process. Different customer segments might value different features; the company can choose to satisfy them all or limiting their offering to a few of them (resulting in losing the customer segments whose wished outcomes are not met). The interview data can also show weaknesses in the whole industry, opening another growth opportunity for the company. (Ulwick, 2002)

Understanding the customer needs is important when the value proposition is formulated. After the understanding of the customer is gathered with the above-mentioned process and a set of possible value propositions are defined, this thesis suggests that the external factors should be analysed. As we will see in the following chapter, the macro environment that the ecosystem will act within, is equally important as the needs of the end users. How the proposed solutions fit into this environment should be carefully evaluated for the company to gain great profits and avoid large losses.

4.1.2 Macro environment and competitors

Rong et al. (2015) define the business environment as a space of opportunity; the space where organisations can share their ideas and visions with each other. An understanding of this environment can work as inspiration for how to initiate, enter or develop the business ecosystem. Moore (1996) emphasises the importance of managing the relationship with those that shape the society, i.e. the government or

other leading organisation. Initiating a business ecosystem will lead to social change, and change elicit reactions, almost always from the government. Considering the society while planning the value proposition is thus critical. Another important variable to consider while initiating, entering or developing a business ecosystem is what trends drive the society forward. (Moore, 1996) These trends can either expose opportunities, as when new technology is developed, or restrict the business, as when the regulations and customer demand are increased.

Cadle, Paul & Turner (2010) verify the importance of analysis of the macro environment. According to them, the environment is constantly changing, and if the organisation fails to identify these changes it risks losing its profitable position. Cadle et al. (2010) mention two techniques to analyse the macro environment: PESTEL analysis and Porter's Five Forces analysis. PESTEL analysis gives an overview of the business environment that the company needs to adjust to or change if needed, while Porter's Five Forces discusses the competitors that are a part of the macro environment. These analysing techniques together provide a detailed picture of the current business environment. (Cadle et al., 2010)

PESTEL stands for **P**olitical, **E**conomic, **S**ocio-cultural, **T**echnological, **E**nvironmental (or ecological) and **L**egal, and provides a framework for analysing the macro environment for an organisation. The wideness of the analysis can vary, with variations like for example:

- PEST (**P**olitical, **E**conomic, **S**ocio-cultural, **T**echnological),
- PESTLIED **(P**olitical, **E**conomic, **S**ocio-cultural, **T**echnological, **L**egal, **I**nternational, **E**nvironmental (or ecological) and **D**emographic) and
- STEEPLE (**S**ocio-cultural, **T**echnological, **E**nvironmental (or ecological), **E**conomic, **P**olitical, **L**egal and **E**thical). (Cadle et al., 2010)

In order to understand how to work with the framework, a worked example will be reviewed. Song, Sun & Jin (2017) have committed a PESTEL analysis of the waste-to-energy (W2E) industry in China (only the PEST part of the example will be discussed in this thesis in order to keep the discussion brief), and the following topics were considered in their analysis:

Political:

Industrial policies: The government of China has attempted to incentivise private-owned companies to participate in the W2E industry by standardising the prices of public products and services, imposing capital injections, offering investment subsidies, low-interest loans and tax cuts, and removing regional blocks and industrial monopolies. Municipalities have been encouraged to treat their municipal solid waste (MSW) by combustion. (Song et al., 2017) All these factors are in favour of a W2E industry.

Economic policies: The economic polices employed by the Chinese government included taxation benefits, preferential power prices, purchase commitments and supportive policies for construction. Actors pre-treating the MSW or using MSW as fuel in their power plant have been promised favourable value-added taxes (VAT), sales taxes and income taxes. W2E power plants using less than 20% conventional energy got subsidised power prices. Grid enterprises should strive to buy their grid-connected power from renewable energy power plants. W2E plants should be prioritised for infrastructure bank loans, and new MSW treatment facilities should be provided with the needed land for construction. (Song et al., 2017) Even these policies support the W2E industry.

Technological policies: The technological policies mainly consist of requirements: the construction and operation of the furnaces should meet industry standards, the actual volume of MSW used in the plant should not be below 90% of the designed value and the facilities should be equipped with automatic solutions for feeding of the fuel. The site should not be established closer to another building than 300 m. The dioxin emissions should be kept lower than 0.1 ng TEQ/m^3 (TEQ = toxic equivalency). Apart from these restrictions, the Chinese government has promoted R&D investments for W2E incineration technologies. (Song et al., 2017)

Song, Sun & Jin (2017) have identified issues that still should be improved by the Chinese government in order to improve the business environment for enterprises entering the W2E industry in China: The supervision is weak, lacking clear provisions and mechanisms on how to and who should carry out the supervision. The obligations and rights of the private actors are unclear, the MSW supply information provided by

the government has been inaccurate and the decision-making processes are slow. (Song et al., 2017)

To amplify what an organisation could investigate regarding the political environment, the following list has been encapsulated:

- Industry regulations
- Taxation
- Environmental regulations
- Supportive policies
- Technological standards

This and the following lists are far from complete and should only be considered a starting point for the investigation.

Economic:

Different investors: The W2E incineration plants have been funded in three different ways during time: by direct investment by the government, by state-owned enterprises or by the private sector. Lately, the number of investors in the W2E industry has risen to 50, and these can be divided into three categories: government-oriented enterprises, professional investment operation enterprises and project investment operation enterprises. All these investor categories require different agreements. The first-mentioned operate as a platform for projects built by the local government, the second introduce technology developed by others and focus on operations management, and the third utilises independent technology and on construction and operations management. (Song et al., 2017)

The local economic situation: Since China is the fourth largest country in the world (Plecher, 2019), the economic situation of the different parts of the country varies. The majority of the existing W2E plants are in the eastern part of China, because of highly developed economies, high population density, large amount of MSW and lack of land area to store the MSW. (Song et al., 2017)

Investment intensity: The investors usually prefer investing in megalopolises (Beijing, Shanghai and Guangzhou) because of their large population, highly developed economies and large amount of MSW. In these areas it is, however, expensive to

construct the plants: imported equipment is expensive to bring here, the emission limits are strict, the land acquisition costs and the costs for administration and supervision are high. These factors contribute to the sky-rocketing investment intensity in the megalopolises. In the eastern area, the government is supporting W2E projects with relatively high subsidies, so even though the investment costs in this area also are high, the investment intensity is lower than for the megalopolises. (Song et al., 2017)

Sources of income: In China, the main sources of income for W2E plants consist of the subsidies handed out for MSW treatment and the grid-connected income. However, the subsidy for MSW treatment is lower in China than in developed countries, and the heating value of the MSW is low resulting in poor power generation and low incomes. (Song et al., 2017)

The encapsulated list on economic factors to consider while doing a PEST-analysis would be the following:

- Investing models
- Gross domestic product
- Investment intensity
- Income sources
- Inflations (Wu, 2017)
- Business cycles (Wu, 2017)

Social:

MSW classification difficulties: The urbanisation increases the difficulties in handling the MSW in Chinese cities. This leads not only to environmental pollution, but also human health is in danger due to the toxic and carcinogenic substances that spread out from the waste. This leads to protests. Another issue that increase the difficulties in handling the MSW is the insufficient classification of the MSW. The public has little knowledge in waste sorting, and facilities for sorted waste are scarce, leading to remixed MSW. (Song et al., 2017)

Public concern: The W2E incineration is a two-sided solution; on the one hand it can lower greenhouse gas emissions, but on the other hand the dioxin emissions are carcinogenic. In China, the major issue for the public is the lacking information about the W2E plants' flue gases and their effect on health. The plants that are open to the

public and report their emissions have managed to restore the public's trust in the W2E solution. China has therefore set a requirement for all W2E plants to report their pollutant emissions by 2020. (Song et al., 2017)

To analyse the social matter, the following things could be considered:

- Public opinion
- Demographic changes (Cadle et al., 2010)
- Distribution of income (Wu, 2017)

Technical:

MSW characteristics: The characteristics of the Chinese MSW is tricky, with high moisture content and low heating value. These attributes of the MSW challenge the technology used in the W2E incineration plants. The World Bank states that the minimal heating value of the MSW should be 7000 kJ/kg, but the MSW in China has a heating value that at its maximum reaches 7530 kJ/kg. This increases the requirements for the pre-treatment of the fuel. The characteristics of the fuel in the area should be carefully investigated before deciding which technical solution to use in the plant. (Song et al., 2017)

Incineration techniques: The two main technologies used for W2E incineration are grate furnaces and fluidised beds. The grate technique is developed to burn fuel with high heating value and low moisture content and is so forth not suitable for the Chinese MSW. Local actors have tried to develop the technique to suit the Chinese MSW, but so far there is a large gap between the performance of local and imported furnaces; the expected lifetime for an imported furnace is at 30 years and for a domestic only three years. The fluidised bed can be used for fuels with lower heating value, since the technology requires auxiliary fuels that enables a more thorough incineration. This, however, causes problems since subsidies are only given to W2E plants that use less than 20% coal in the incineration, and that limit unfortunately is exceeded by the fluidised bed reactors. (Song et al., 2017) Consequently, there is no right answer regarding which technology that should be used.

The following technological aspects could be taken into account during a PEST-analysis:

- Quality of raw material
- Different technological solutions
- Technology development process (Wu, 2017)

Five Forces of competition

The Five Forces analysis provides a framework for assessing the competitive environment of the focal company. To emphasise the importance of analysing the competitive environment, Michael E. Porter (2008), the originator of the analysing framework, is cited:

> *"Awareness of the five forces can help a company understand the structure of its industry and stake out a position that is more profitable and less vulnerable to attack."* (Porter, 2008)

Porter analyses the competitive forces of a company with a traditional strategising lens. The goal for a company in a business ecosystem is the same as in the traditional industry; be more profitable and maintain the position in the ecosystem. The heart of strategising in ecosystems is to find alignment between actors (Adner, 2017) and, by employing the Five Forces analysis, both the interdependencies and the complementors are evaluated. This will give a good overview of the ecosystem actors and their alignment. Adner & Kapoor (2010) have mentioned the fact that in order for the focal company to be able to create and capture value, it is important that all actors in the ecosystem solve their innovation challenges (Adner & Kapoor, 2010). The Five Forces analysis creates an overview of who some of the actors are apart from the focal company, and how they can influence the focal company's value proposition. The Five Forces analysis is explained closer in the appendix.

4.1.3 Company capabilities and assets

Moore (1993) mentions the advantage achieved by recognising the capabilities and assets of the companies, by implicating that the individual actor has bargaining power when it has something that the ecosystem needs. A structured resource portfolio

clarifies the added value of inviting the focal company to the ecosystem. (Tsvetkova et al., 2017) Adner (2017) notes the importance of assessing the capabilities of the individual actors in the ecosystem to avoid the alignment risks mentioned in chapter 3.2.6, and Adner & Kapoor (2010) state that knowledge about the resources existing in the ecosystem improve the possibility to detect bottlenecks. Adner (2017) also points at the importance of the value, rarity and inimitability of the resources and capabilities in order to maintain the competitive advantage. (Adner, 2017)

As Peteraf (1993, referred to in (de Bakker & Nijhof, 2002)) has noticed that the concepts of 'capability' and 'asset' are used in various ways. To avoid confusion, a clarification of the terms is made for the context of this thesis. The resource-based view of the firm defines a company as a set of resources that are needed for value creation. These resources can be divided into assets and capabilities. A capability is the company's ability to employ resources and organisational processes to achieve the company's goal. Coordination is one example of an important capability. An asset can be both tangible and intangible, with the employees being an example of a tangible asset and the employee's knowledge being an example of an intangible asset. (de Bakker & Nijhof, 2002)

Christensen (1997, referred to in (Björkdahl & Börjesson, 2012)) and Wernerfelt (1989) have divided the capabilities into three different building blocks:

1. Resources/ fixed assets: including for example people, equipment, firm-specific investments and relationships with external partners. These resources are simple to think about, but they add little strategic advantage since these resources are usually limited and therefore offer little room for strategising.
2. Processes/ blueprints: activities that increase the value of the input, for example coordination, communication, decision making, patents and reputation. These are the resources with unlimited capacity, and they can be deployed in several markets enabling strategising. In a business ecosystem setting, these are the resources that bring bargaining power.
3. Values/ culture: how the decision-makers motivate their decisions and the collective way-of-working in the company. These should be assessed in order to be able to improve collaboration in the business ecosystem.

Barney (1991) has developed a framework to help managers to assess whether their capabilities and assets provide competitive advantage or not; similarly to Adner's (2017) statement, he has proved that the resources should be valuable, rare and imperfectly imitable, and on top of that, the resources should not be substitutable. The framework goes under the name VRIO: valuable (V), rare (R), imperfectly imitable (I) and systematically used by the organisation (O).

Valuable resources enable a company to improve its efficiency. Such resources should be able to harness opportunities and neutralise threats. The *rarity* condition comes from the definition of competitive advantage; the company needs to have resources that differentiate it from its competitors. The generic resources should of course not be underestimated, but in order to achieve an advantage over the competitors some of the resources should be unique. To maintain the rare resources, they should also be *imperfectly imitable*, i.e. the competitors should not be able to obtain the resource. Resources that are patent-protected are examples of these resources. Further, if the resource is complex it is also difficult to imitate it. (Barney, 1991) The exploitation of the resource in the *organisation* is crucial. If the resource is implemented in an organisation process, and hence improving efficiency, it will increase the competitive advantage. Entangled in a process, it is also increasingly difficult for the competitors to understand the resource and hence, imitating the resource. (Cardeal & António, 2012)

The different capabilities and the definition of which resources that increase competitive advantage for the company, should work as a framework for managers that need to map their company's capabilities and assets, supporting their thinking process in order to acknowledge every critical resource. Once participating in a supra-organisational meeting regarding responsibility division in a business ecosystem, the manager has a structured package to use as bargaining power.

Rong et al. (2015) have raised an extended level of the capabilities which are important for network analysis: capabilities of communication and sharing, integration and synergising, innovation and learning, and adaptation and restructuring. This illuminates that a company working in a business ecosystem has difficulties surviving without the important ability to cooperate. These capabilities, called dynamic capabilities will be further discussed in chapter 4.3.2.

4.2 VALUE CAPTURING – IMPLEMENT THE BUSINESS ECOSYSTEM

So far, the ecosystem value proposition has been set and the resources existing in the ecosystem should be known. In the value creation phase, some of the actors might have been decided already, but some of them might still be unknown. It might also still be unclear how the ecosystem should be structured: who will perform which tasks, with whom should they be collaborating and how should the collaboration be actualised. These gaps will be closed in the following subchapters. The second phase of the business ecosystem strategising process is to increase and improve the value capturing for the ecosystem as a whole and for the individual company as well.

4.2.1 The business ecosystem architecture

The value creation phase has defined the customer needs, the macro environment and the actors' capabilities and assets. Now it is time to gather these pieces together to create a clear picture of what needs to be done and by whom to fulfil the wishes of the customers. For this matter, Tsvetkova et al. (2017) suggest a graphical ecosystem activity map (see Figure 5). The map will provide the ecosystem actors with a simplified picture of how they should collaborate to fulfil the customers' needs to the greatest extent.

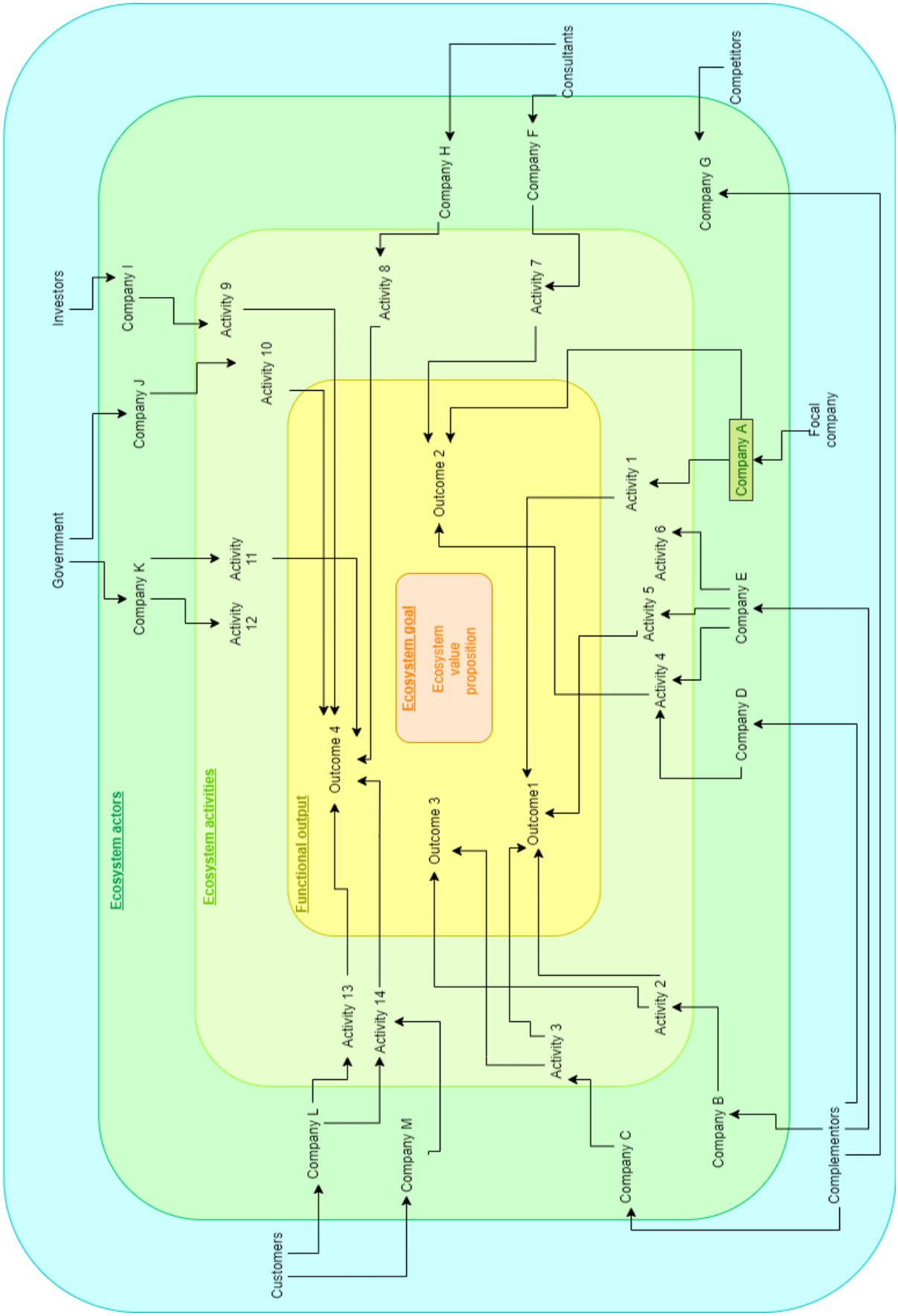


Figure 5. Ecosystem activity map (Tsvetkova et al., 2017).

Tsvetkova et al. (2017) propose to start the ecosystem activity mapping by adding the **ecosystem goals** to the core layer of the map. These goals could, for example, be an outline of the outcomes from Ulwick's interview process described in chapter 4.1.1.

The following layer, the **functional outputs**, are the tasks that should be executed to create a beneficial environment for the ecosystem to act in. The PESTEL analysis could be a good framework for determining which functions should be preferred. The competitive forces listed by executing the Five Forces analysis should also be remembered while mapping the functional outputs. It would be of great importance to turn competitive threats into collaborating forces or totally exclude them from the business environment.

How the functional outputs could be reached should be mapped in the following layer of the ecosystem activity map, the **ecosystem activities** layer. Mapping of these activities will show the challenges that need to be overcome in order to complete the alignment between the actors. Chapter 3.2.6 of this thesis discussed the different alignment risk categories that Adner (2017) has identified during his work with business ecosystems.

Mapping the specific ecosystem activities is supposedly easier if the actors of the ecosystem are known. The activities can then be decided based on the actors' capabilities and knowledge. However, it is of greatest importance not to forget the goal, which in practice might mean that new actors are to be included to complete the activities needed for the functional outputs of the ecosystem. Therefore, the ecosystem activity mapping ought to be considered an iterative process, adding actors and activities along the way during discussions.

The actors are mapped in the last and outmost layer of the ecosystem activity map, the **ecosystem actors** layer. To gain a conception of which actors should be included in the ecosystem, the supply chain could be used as a starting point. Since the supply chain excludes complementing actors on the demand-side and other influencing actors, e.g. the government, authorities and investors, these should be added to the ecosystem activity map if they affect the value proposition in a non-generic manner (Adner, 2017; Jacobides et al., 2018). Generic and non-generic complementarities have been discussed in chapter 3.2.3.

Another supportive tool for business ecosystem visualisation is the Ecosystem Pie Model (EPM) developed by Talmar et al. (2018). Figure 6 shows an empty version of the EPM with short descriptions of the different elements included in the visualisation tool. This tool requires a deeper analysis of the ecosystem than the activity map and is hence more time consuming to fill in. However, once it is thoroughly filled in it should provide a detailed overview of the ecosystem architecture.

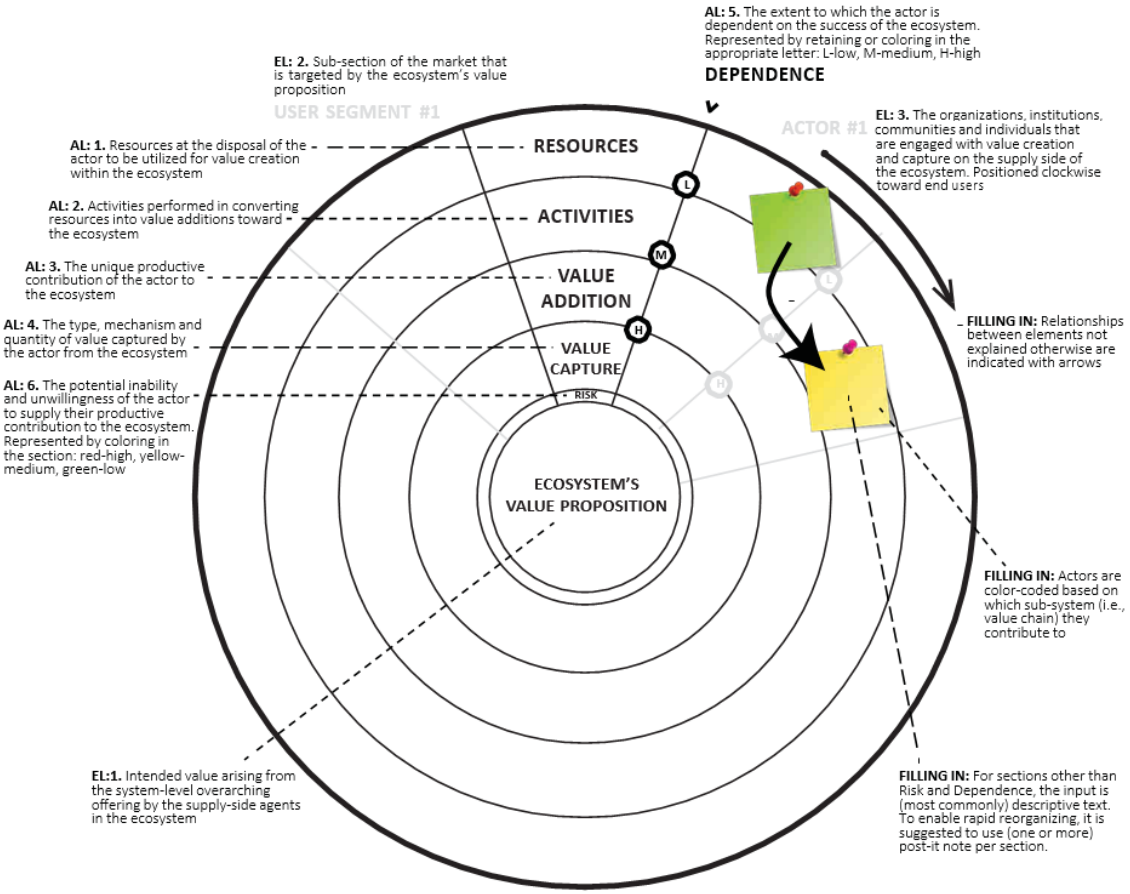


Figure 6. Ecosystem Pie Model (Talmar et al., 2018).

The pie segments represent different actors in the ecosystem, and the circles contain the crucial properties of an actor in a business ecosystem. The properties are how the actor has decided to create and capture value, which activities it is performing and with what resources it is contributing. In the core of the pie the value proposition is formulated. Table 1 is a simplified version of the one that can be found in the article "Mapping, analyzing and designing innovation ecosystems: The Ecosystem Pie Model" by Talmar et al. (2018), and it explains the different components in the EPM. For a better description of how to use the tool the article by Talmar et al. (2018) and their webpage (Talmar, n. d.) could be consulted.

Table 1. Short explanation of the components included in the EPM

Construct	Description
Ecosystem's value proposition (EVP)	This has been decided in the previous phase of the framework developed for this thesis. Usually the EVP is a combination of customer needs and requirements formed by the macro environment.
User segments	This is the end customer, the user of the deliverables of the ecosystem. The user can also contribute actively to the ecosystem, e.g. by providing user data to the suppliers.
Actors	These are the participants that create the value for the ecosystem and eventually also the ones that capture the value. They are legally independent but economically interdependent in the ecosystem. An ecosystem actor should contribute with non-generic complementarity (see chapter 3.2.3)
Resources	Resources are the assets and capabilities that the actors provide to the ecosystem. More about these in chapter 4.1.3.
Activities	Activities are the mechanisms that will realise the EVP. The activities are performed by the individual actors, but they affect the value creation process of the whole ecosystem.
Value addition	The value addition is the outcome of an activity that grows the profits of the whole ecosystem.
Value capturing	Value capturing represents how the actor captures value, what kind of value and how much value it receives from the ecosystem. This is usually how the actor is incentivised to participate in the ecosystem.
Dependence	As discussed in chapter 3.2.6, the individual actor has different incentives that decide how dependent the company is on the outcome of the ecosystem. The higher the dependence of the actor, the more effort it will put into the ecosystem.
Risks	This construct correlates with the dependence construct. If the actor is unwilling or unable to perform its task, it is a risk factor.

4.2.2 Ecosystem alignment and partnering process

For the business ecosystem to capture the value it creates it is of great importance that the actors performing the different activities are aligned and know what their tasks are. They need to have a clear picture of whom they should be cooperating with and whom they compete against. Deciding which actors should be incorporated in the ecosystem might occur as a challenge for the management group, but one way to initialise the collaboration is to include every actor directly involved in the major material flows (Tsvetkova, Gustafsson, & Wikström, 2014). When these have been analysed, there are certainly several activities that still are needed to establish the value proposition, and these indirect actors should also be added to the ecosystem analysis (Tsvetkova et al., 2014). The actors providing generic complementarities, actors that are expected to stay put, should be excluded from further analysis in order to keep the ecosystem manageable (Adner, 2017; Jacobides et al., 2018). When all the actors of the ecosystem are defined, the partnership should be concretised. This can be managed by implementing a partnering process.

In this subchapter different alignment strategies will be presented, and after that a concrete partnering process is suggested. A difficult discussion that needs to be handled in a business ecosystem environment is the question of who should capture how much value (Tsvetkova et al., 2017). This question is therefore an important one to mention during partnering discussions. This thesis suggests how to decide what an equitable share is for the focal company.

Hannah & Eisenhardt (2018) have committed a profound literature review, and noticed that the balance between cooperation and competition causes severe problems for many ecosystem actors, complicating the value capturing for the ecosystem as a whole and for the individual company. By conducting a study on an incipient ecosystem, they have managed to conclude how successful companies strategise over time to find their place in the ecosystem alignment.

The balance between cooperation and competition has been addressed in several research articles but, according to Hannah & Eisenhardt (2018), they have a static view on the balance over time. However, they build their theory on the existing strategising models: *system strategy* and *component strategy*. To complement, they contribute to the research by proposing a third model, *bottleneck strategy*.

A company following the *system strategy,* will strive to individually introduce as many of the needed components to the ecosystem as possible. The cooperation between the ecosystem actors will so forth be minimised, and at its extreme, the ecosystem will be totally managed by only one company. The *component strategy* is implemented by a company that enters only one component to the ecosystem while trying to maximise the cooperation with other companies that are more capable of producing the rest of the components. The *bottleneck strategy* is a mix of the previous strategies. A company entering an ecosystem implementing this strategy will enter in a bottleneck position (explained in chapter 3.2.3) of the ecosystem, hence the name *bottleneck strategy*. It will do this by cooperating with actors that perform the complementing tasks, but at the same time setting up barriers against competitors. (Hannah & Eisenhardt, 2018)

Hannah & Eisenhardt (2018) also explain the importance of committing to one of these strategies in order to have a consequent direction over time. In their article they have analysed five different actors in the solar energy industry in the United States, and one conclusion they made from this analysis was that the two actors that failed to stick to one strategy over time were eventually unsuccessful in maintaining their business up and running.

As mentioned above, a company following the *system strategy* enters the ecosystem with a competitive approach. In the solar panel industry example in Hannah & Eisenhardt's article (2018) they define the five different subcategories of the ecosystem as photovoltaic solar panels, racking, sales and design, installation and finance. Jupiter, which is the company entering the ecosystem with a system strategy, sees the opportunity to enter by providing a better financing model than the existing one (the existing financing model is the bottleneck of the ecosystem in the beginning). They also want to be as self-sufficient as possible, not having to count on other actors to provide the other components of the ecosystem. To achieve this, they also enter the installation and the sales and design components and, at a later stage, they also include the panels and the racking to their offering. To have knowledge in all these components is naturally resource-intensive, expensive and time-consuming in the beginning, but at the same time the company becomes dynamic once the components work and can easily keep up when the bottleneck switches to another component. Since the company has a head start during a bottleneck switch, they might also focus on increasing the barriers for the actors entering the component at a later stage by, for example, refusing

to provide their complementarities to the rivals or attacking the field of the rivals with a price-cutting expansion. (Hannah & Eisenhardt, 2018)

The company entering the ecosystem with a *component strategy* enters with a cooperating approach. This company chooses to focus on their main knowledge and cooperate for the other components. In Hannah & Eisenhardt's (2018) solar panel example, Venus is the company entering with this strategy. They entered the ecosystem in a non-bottleneck component; they believed in their knowledge in the sales component. Since they were unable to affect the bottleneck, they suffered while the bottleneck was in the finance component, having difficulties finding complementors willing to cooperate without exclusivity terms. Once the bottleneck moved to sales, the company had an advantage, and since the component strategy requires cooperation with other actors, they used this advantage to also help their complementors during this time; in this case they introduced a platform where knowledge could be shared between the complementors. This platform helped Venus once the bottleneck again shifted to another component, this time installation. During their prosperous time they had built strong relationships with their complementors, and the culture of cooperation was now strong in this ecosystem. Venus managed to succeed even though they had a slow start. (Hannah & Eisenhardt, 2018)

According to Hannah & Eisenhardt (2018), there is a third strategy to follow in a business ecosystem: the *bottleneck strategy*. This strategy is implemented by Saturn in the solar panel industry example in their article. This company searches to enter through the bottleneck component, exclusively. This focus on one component makes the entrance into the ecosystem efficient, making the actor a predecessor. This allows the actor to put up high barriers before rivals have time to enter the field of their component and, at the same time, many complementing actors are eager to be a part of the thriving ecosystem, making cooperation easy for Saturn. The disadvantages of this strategy occur when the bottleneck shifts to another component, especially if there are several other actors in the new field. A company following the bottleneck strategy unfortunately needs to switch their focus into the area of the new bottleneck, and if the competition in that area is fierce, the company will have troubles overstepping the barriers set by the new rivals. However, if there is little competition in the new component area, the strategy is efficient and dynamic. While the bottlenecks change over time, Saturn turns into a company looking more like a company following the

system strategy, adding new components to the portfolio as new knowledge is acquired. In order to stay true to the initial strategy, it is important to eliminate components that are no longer the bottleneck components, keeping the company agile. In order to achieve this, vast effort needs to be put into management of the company since it is of great importance for the company not to miss a bottleneck switch. (Hannah & Eisenhardt, 2018)

Regardless of which of the above-mentioned strategies the focal company chooses to follow, a partnering process should be followed through with all the complementing actors. Relying on partners to provide complementing components will enable a quicker scale-up initially (Hannah & Eisenhardt, 2018). An ideal partner should have the following attributes (Rubenstein, 2012):

- The strategy of the partner should be complementary rather than competitive
- The partner should be interested in change, constantly looking for new possibilities
- The partner preferably would only be part of one business ecosystem

Crane, Felder, Thompson, Thompson & Sanders (1997) have gathered a five-step partnering process on a general level to help a company that enters a partnership. This process will help the partners to understand each other better and to align their activities in a more efficient manner.

The five steps of the process that Crane et al. (1997) have developed (see Figure 7) are the following: 1) owner's internal alignment, 2) partner selection, 3) alliance alignment, 4) project alignment and 5) work process alignment. Crane et al. explain the importance of carrying out every step of the process and tailoring the process to suit the situation the company and the future partners are in.

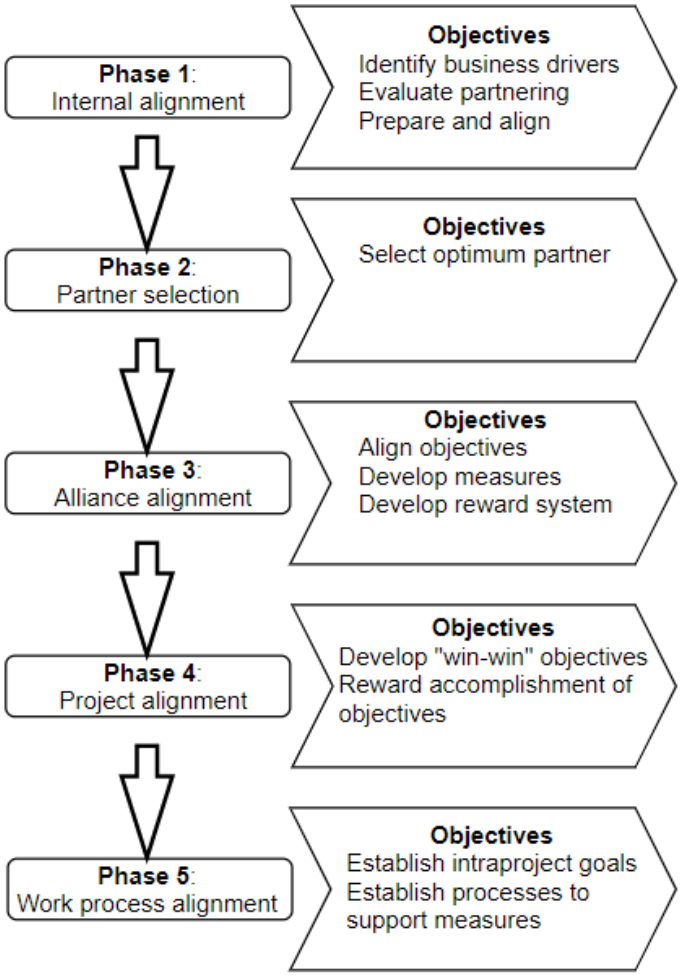


Figure 7. Partnering process (Crane et al., 1997).

Step 1: Owner's internal alignment

Crane et al. (1997) suggest to initiate this phase by determining the business drivers of the focal company. Examples of business drivers are *expansion* and *reducing costs*. (Crane et al., 1997) These business drivers are the purpose of the company, the reason why the company exists.

The second part of this phase should already have been completed when analysing the company's capabilities and assets in the value creation step of the framework collected in this thesis. Once the company's capabilities are mapped, the lacking resources and capabilities needed for the end value are detected. By considering these lacking resources, the focal company can list the competencies the partners should have.

An evaluation of the partnership should be done. The cost and added value of the partnering process and the final partnership should be considered. How the partners contribute to the business drivers should also be recognised. Additionally, examining different partnership types and the level of the needed partnership is also essential. However, these evaluations are difficult to define on a general level. (Crane et al., 1997) Every partnership should be considered independently, creating different evaluation models depending on how the partner contributes to the value proposition.

When it has been decided that a partnership is the most suitable option for proceeding, the focal company should prepare by aligning for partnering within the organisation. The company culture should be reviewed and perhaps changed, and reluctant employees fearing their position in the company due to the partnership should be soothed. Another addition to boost the internal alignment of the company would be to choose an internal asset whose task would be to maintain the continuity of the partnering process. (Crane et al., 1997)

Step 2: Partner selection

The partner selection phase should be initiated by collecting a team of members from every department that will be affected by the partnership. Iansiti & Levien (2004) also emphasise the importance of an interdisciplinary team, since they gather different perspectives and experiences, and at the same time they provide the employees with protection and inspiration needed during changes. Firstly, this interdisciplinary team collects a list of criteria the future partner should meet based on the work done in step 1. Secondly, the team develops a list of potential partners that meet the listed requirements to a satisfying level. When the list of potential partners is collected, the actors should be thoroughly inspected. This is mostly done by interviews, asking questions about company culture, business practices and ability to align business objectives. (Crane et al., 1997)

A good strategy is to choose partners that are committed to similar business drivers. PBI Research Institute (personal communication, December 2019) has developed a method for monitoring a company's strategy implementation, which includes analysis of the customers' and other critical stakeholders' vision and the suitability with the focal company's strategy. For example, one energy technology company's strategy was analysed in this way. This provided them with a list of high potential customers

that had similar strategic visions as the company regarding how the energy ecosystem should look like in the future. These customers are more likely to be receptive to the company's sales efforts and thereby are more likely to invest in the solutions provided by the company.

Another good strategy would be to choose partners that are strong on their own. In Hannah & Eisenhardt's (2018) solar panel industry example, Saturn selects complementors that are large in size and have a good reputation. This brings two advantages; first, Saturn needs fewer partnerships since every complementor can perform several tasks, which makes it possible for Saturn to focus on improving the relationship with those actors. Second, since the complementors already have a good reputation on their own, they can improve the overall reputation of the whole ecosystem.

Step 3: Alliance alignment

Aligning the partners' goals and objectives increases the understanding between the two companies. This alignment can be achieved naturally or proactively. The proactive approach includes team-building sessions and workshops, and additionally the approach might appear as a separate partnership organisation or supporting of social activities. Information sharing is crucial to maintain trust and by keeping employees involved in the decision process, trust is further developed. Communication can be sustained with e.g. regular meetings, newsletters and emails. (Crane et al., 1997) Setting up a platform for information sharing is another measure to involve the actors in the business ecosystem (Hannah & Eisenhardt, 2018).

Including partner management in both parties' strategic plans is of outmost importance. The alignment process should be logical and go from general to specific over time. The alliance contract should include goals and specific milestones, which will guide the partners' actions in the future. The progress of the alignment process should also be monitored. The measures to monitor can be either quantitative, e.g. cost changes or schedules, or qualitative, such as employee feedback. The alignment process is complex, and several measures should be considered. The measures will vary depending on the goals set for the partnership. Finally, attractive incentives should be developed to reward progress in the partnership process. (Crane et al., 1997)

Step 4: Project alignment

If the partnership is project-based the incentives to work on the relationship are lower, and the time to develop the relationship is shorter. However, the quality of the partnership is equally important for working together in a project as it is in an alliance. The same success factors are included in the project alignment process as in the alliance alignment process, but now the aim is to set objectives for one successful project instead of several. A partnering contract will support the work during the project, helping both parties to understand the other's goals and success metrics. Since the time for building the trust is so short in project-based partnerships, more resources should be put on quicker solutions, such as sponsoring social activities or workshops. (Crane et al., 1997)

Step 5: Work process alignment

In this phase the work processes of the partners should be reviewed. Insight should be gathered from the whole company, from management level to the lowest level, about their way of working in order to optimise the work processes. This optimisation leads to higher efficiency and fewer overlapping activities. Every employee should also be informed about the objectives for projects and long-term partnerships. When the employees are included in the alignment process and they feel that their suggestions are heard, their motivation for their work increases, which also might increase the efficiency. Dispute resolution is also included in the work process alignment phase. A formal dispute resolution process should be taught to employees at every level of the companies in the partnership. If the disputes can be solved at an early stage, managers will not need to interfere, which consequently will increase their time to maintain a good relationship with the partners. (Crane et al., 1997)

One thing that differentiates a traditional partnering process from the partnering process that should be implemented in an ecosystem is the discussion about how to share the value made collectively. Equally important as the value creation is for the ecosystem, is the value captured for the individual company. A company that is poorly incentivised might be unwilling to contribute to the ecosystem (this will be further discussed in chapter 4.3.1). The company needs to be rewarded with an equitable share of the value created by the whole ecosystem (Tsvetkova et al., 2017). The value can be captured both directly and indirectly through an ecosystem orchestrator. The direct

transactions tend to be instantaneous, while the indirect transactions are collected by the orchestrator, who is in contact with the customer, that then further divides the profits to the ecosystem actors. (Davidson, Harmer, & Marshall, 2015)

Deciding how large the equitable share is might induce disputes, and for that reason it would be important to come to a clear agreement about how to share the profits already at an early stage in the collaboration process. Tsvetkova et al. (2017) suggest that the share an actor is receiving should match the contribution of the same actor. Since the value created in an ecosystem might be both tangible and intangible, with traditional financial profits as an example of tangible value and knowledge and reputation as examples of intangible value (Talmar et al., 2018), there are no clear measures how to evaluate the equitable share for every actor, but it should therefore be discussed in detail during the partnering process. Bargaining power is important at this stage and by having a structured portfolio with capabilities and assets that match the VRIO requirements discussed in chapter 4.1.3, the company is able to motivate its equitable share of the captured value (Lepak, Smith, & Taylor, 2007). A method for how to share the value in a fair manner will be suggested in chapter 4.2.3.

Another factor differentiating the traditional partnerships from partnerships in a business ecosystem is that in a business ecosystem even the indirect partners should be considered. The focal company is not only in contact with its direct suppliers and direct customers, but also complementing actors and other stakeholders, such as governmental authorities, are important actors affecting the final value proposition. (Moore, 1993) To form a common goal that every actor included in the ecosystem is satisfied with, the collaboration process should be structured and clear for every participant. A platform is an efficient way to share values with a broad range of organisations. The platform can be defined as a set of solutions that is available to the participants through various interfaces. The platform can be divided into two separate components; the implementations and the interfaces. The implementations are the technologies, tools, processes or services that are part in the solving of a problem. An implementation is usually owned by one of the actors in the ecosystem, who then shares it with the other members in the platform. The interfaces make the platform accessible for every actor. The interfaces determine how the underlying implementations are used in the ecosystem, and proper interface design is hence of great importance. The coupling strength between the components in a platform is also

decisive: a tightly coupled interface means that the users are highly dependent on the underlying technology, while a loose coupling enables improvements on the technology without affecting the users in a detrimental way. (Iansiti & Levien, 2004)

4.2.3 The role of the revenue model

According to Tsvetkova, Gustafsson & Wikström (2014) the development of a supra-organisational business model builds on a deep understanding of the other ecosystem actors' business models. A business model constitutes of several elements, and two of them are the core elements: value creation and value capturing. The value creation element embraces the offering of the organisation, i.e. the value proposition. The value capturing element embraces the revenue model of the organisation, how the organisation earns its profits. The other important elements of a business model are the customers, the capabilities of the organisation and the cost structure. (Tsvetkova et al., 2014) The value proposition, the customers and the capabilities have already been discussed in chapter 4.1, and in this subchapter the revenue model will be discussed.

Zott & Amit (2010) defines the revenue model as the method that a company employs to enable revenue generation, and it is a part of the business model. The revenue model could be called the pricing strategy of products and services. Zott & Amit (2010) have stated that the business model is a large part of the focal company's bargaining power, and hence, their possibility to create value. To which extent the company can capture that value depends on the revenue model it has chosen to follow.

Bonnemeier, Burianek & Reichwald (2010) have developed a generic price management process to systematise the complex pricing process for solution providers. Bonnemeier et al. (2010, p. 229) define a solution as ". . . a customized and integrated combination of goods and services designed to meet customer's specific business needs." A solution provider is a customer-centric actor that changes the customers' business models additionally to providing customised products and services. (Bonnemeier et al., 2010) Comparing this definition of the solution provider with the definition of a business ecosystem, similarities can be noticed, and hence the generic price management process could be implemented in a business ecosystem context as well. The generic price management process includes six separate steps:

pricing strategy, price analysis, price definition, internal price enforcement, external price enforcement and price controlling (see Figure 8).

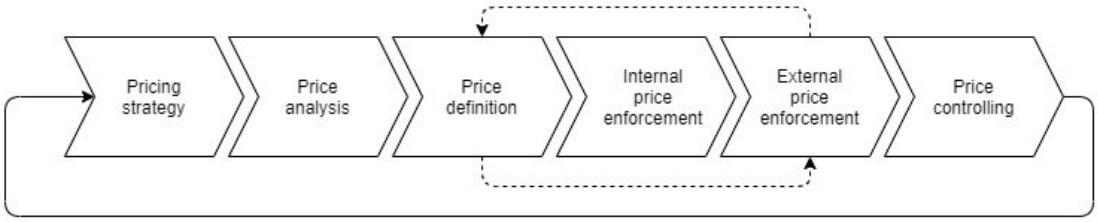


Figure 8. Generic price management process (Bonnemeier et al., 2010).

The strategic goals, or the business drivers, of the focal company should steer the *pricing strategy*. For example, if a firm strives to increase their market share, the pricing strategy should reflect that. The pricing strategy should be planned for a long period, considering that customer requirements will evolve over time. The competitors pricing strategies should also be considered, and clear guidelines for how to react once the competitors cut their prices should be pre-planned. An example of a pricing strategy is to have low initial costs on products combined with high service or maintenance costs. This is an example of a customer life cycle-oriented pricing method. (Bonnemeier et al., 2010) Other pricing methods are cost-based pricing, competition-based pricing and customer value-based pricing. Research has shown that the customer value-based pricing strategy is superior to the other strategies, since it takes the customer perspective into consideration, and will hence provide a better agreement on the price level. It is however rarely used, possibly because of the difficulties in defining the customer value. A business ecosystem analysis might reveal the complex value creation process, hence enabling switching to a value-based pricing strategy (Anastasia Tsvetkova, personal communication, March 2020). The customer value could also be measured through, for example, expert interviews, customer focus group interviews or through assessing the customers using the product or service. (Hinterhuber, 2008) This assessment of the added value for the customer is a part of the *price analysis* step in the price management process. Apart from these assessments of the customer's value creation process, the price analysis should also include external

information, such as market studies made by research institutes, market databases or competitor's price lists. (Bonnemeier et al., 2010)

The *price definition* step should be carried out in interdisciplinary teams including members from the pricing office, product management and from the marketing and sales departments. By having an interdisciplinary team defining the prices saves time when coordination between the teams is unnecessary, and uncertainty about the price level is also avoided. The prices can be defined with a traditional or an innovative revenue model. There are two traditional pricing models: the fixed-fee model and the cost-plus model, and three innovative pricing models: usage-based, performance-based and value-based model. How these models work is explained in Table 2. The traditional pricing models are often mixed in different combinations, but the parameter that combines these models is that they are based on the supplier's effort to provide the solution. In the innovative pricing models, the price is no longer dependent on the supplier's internal variables, but rather on the performance of the solution in the customer's business environment. For the supplier to remain profitable the internal costs should of course be considered, but it is not the single most important variable in the innovative pricing models. When the customer's business is considered in the pricing model, the willingness of the customer to buy is presumably increased. (Bonnemeier et al., 2010)

Table 2. Traditional and innovative pricing models (Bonnemeier et al., 2010)

Model	Pricing method
Fixed-fee model (traditional)	Agree on fixed cost. • Property transfer: product sales • Possession rights transfer: renting, leasing, licensing
Cost-plus model (traditional)	Supplier's amount of work + certain agreed profitability cost.
Usage-based model (innovative)	Pre-defined fee per time unit, paying for the time the solution is utilised.
Performance-based model (innovative)	Pre-negotiated price is payed if the promised performance is fulfilled, poor performance might lead to penalties for the supplier.
Value-based model (innovative)	Price correlates with the added value of using the solution, e.g. increased turnover, cost savings or customer satisfaction.

Enforcing the prices is important. *Internal price enforcement* is especially important in large firms, where different departments might have different goals and interests. Internal enforcement is usually realised by setting up a price-related incentive system for the sales personnel that corresponds to the commercial pricing strategy decided in phase 1 of this price management process. (Bonnemeier et al., 2010) Other factors that should be considered while implementing a bonus system are fairness, cultural fit, alignment with HR policies, financial control and bonus administration (Turner, Lasserre, & Beauchet, 2007). After enforcing the prices internally, *external price enforcement* should be executed. This includes collecting an interdisciplinary team for formulating bid proposals and negotiating with the customers. The negotiation could be supported by naming reference customers, and the team should clarify the added value to the customer. (Bonnemeier et al., 2010)

The last step is the *price controlling* step. Even though it is mentioned last in this price management process, price controlling should be performed constantly during the

pricing process. The price controlling can be executed either as process-related, impact-related or as output-related controlling. Process-related controlling can be viewed as the feedback loop seen in Figure 8, always returning to previous steps when complaints are received. The process-related controlling can also be realised by adding life cycle related financial indicators to measure the customer's profitability in different stages of their life cycle. Impact-related controlling focuses on reputation and customer's price satisfaction, while output-related controlling is realised by using performance indicators such as market share. (Bonnemeier et al., 2010)

The above-mentioned pricing process is developed for an individual company, but it can perfectly be implemented on an ecosystem level as well. Additionally, to create a better understanding of how to price the common product, it could be viewed from the perspective of e.g. a joint offering. More about joint offerings and other ways to realise the collaboration will be discussed in chapter 4.3.1.

Due to the complexity of a business ecosystem, it is difficult to share the value created in a fair manner. However, the cooperative game theory has been proved a useful tool when analysing profit allocation problems. This theory includes several solution methods, such as the Proportional value and the Shapely value, with the Shapely value being the most frequently employed. This value ensures that the benefit of every actor is equal to their contribution. The Shapley value is decided according to equation 1:

$$Sh_i = \sum_{S \subseteq N, S \notin i} \frac{S!\,(N-S-1)!}{N!} \big(v(S \cup i) - v(S)\big), i \in N \qquad (1)$$

where *N* are all the individual actors, *S* is the coalition of the business ecosystem and $v(S)$ is the value made due to the cooperation in the coalition. $v(S \cup i)$ is the value made when actor i is added to the coalition, and hence $\big(v(S \cup i) - v(S)\big)$ is the marginal effect of one individual actor. $\sum_{S \subseteq N, S \notin i} \frac{S!(N-S-1)!}{N!}$ is the weight of actor *i*'s ratio of the profit. (Teng, Li, Wu, & Wang, 2019)

4.3 SUSTAINING THE POSITION – IMPROVE THE BUSINESS ECOSYSTEM

When the value creation process and the value capturing methods are analysed and realised, it is of outmost importance that sustainability measures are implemented. Sustainability means capability of the ecosystem to support continued viability (Ruokolainen, Ruohomaa, & Kutvonen, 2011). In practice, this means that the ecosystem should stay alert in order to notice any incoming changes that might affect the ecosystem's competitiveness. The individual company, as well, needs to monitor their competition and their own competitive advantages so that it can maintain its profitable position in the ecosystem.

The world has moved from individual companies making selfish decisions into a world where the companies face difficulties together and gain even greater mutual profits. Therefore, sustainability in this new business world entails maintaining a healthy ecosystem instead of improving the individual firm's capabilities. Keeping the ecosystem healthy is in the interest of all the actors, since the single actor survives or is disrupted together with the ecosystem. (Iansiti & Levien, 2004) For the single actor, sustainability in an ecosystem means sustaining the capability of contributing to the ecosystem value proposition. Improving the actor's contribution to the value proposition will thus enforce the actor's position in the ecosystem. (Tsvetkova et al., 2017)

In practice, ecosystem health will increase when the actors work on their relationships. Co-working leads to dependencies between the actors. These dependencies increase the value created. Common standards and platforms are good measures to improve the position of all the actors in the ecosystem. When resources and knowledge are shared amongst the actors, the ecosystem is dynamic and enables flexibility in innovation and operation. (Iansiti & Levien, 2004) As mentioned in chapter 3.2.6, the dependencies can also lead to difficulties (Adner & Kapoor, 2010). If an actor has problems performing their activity, the rest of the ecosystem also suffers. It is therefore of great importance that the actors collaborate and try to act on any occurred barriers together. If the relationships in the ecosystem depend on a keystone player, for example if the relationships are dependent on the platform the keystone is offering, the other actors should take great care to support the keystone's success in every possible way. (Iansiti & Levien, 2004)

However, in today's business landscape, many companies (especially companies that have a leader role in their ecosystem) are still selfish and naval-gazing (Chen, 2019; Iansiti & Levien, 2004). If a company must make a difficult business decision, unfortunately today, many firms improve their own short-sighted position instead of considering the effects for the whole ecosystem. Especially if the benefits for the company are indistinct, the managers making the decisions have difficulties staying put on the agreed strategy of the ecosystem. Another common mistake that managers of individual companies make is that they forget that their direct competitors are part of the same ecosystem as they are part of. (Iansiti & Levien, 2004) It is easy to see the competitors as enemies only, but instead the competitors should be seen as co-workers, collaborating to introduce the niche where the offerings are needed. This is extremely important, especially when a new ecosystem tries to disrupt an old ecosystem. To clarify how competitors can collaborate, an example is described. One of PBI Research Institute's customers has faced the situation of trying to enter an ecosystem in the disruptive phase. PBI's customer tries to enter the Asian market by becoming a part of the novel ecosystem of waste-to-energy generation. This ecosystem is still unestablished in the Asian market, and the initial activities to perform is to lobby for a change in the regulations to make waste collection more efficient and to update the regulations regarding the technology used. Lobbying will profit every actor interested in entering the market, and hence the competitors and every other affected actor should develop a common strategy for how to convince the government. (personal communication, October 2019)

The following list is a summary of the above-mentioned activities guiding how to maintain the ecosystem's position:

- Share resources and knowledge
- Collaborate to solve problems
- Introduce common standards and integrative platforms
- Support the keystone actor
- Collaborate with competitors

According to Moore (1996, reviewed in (Rubenstein, 2012)) the individual company sustains its position in the ecosystem by being the only practical source of something that the ecosystem needs. Some examples of attributes that contribute to locking the

position in an ecosystem are e.g. patents, a perfect location, a strong reputation and brand, high-quality offerings, and the lowest price. (Rubenstein, 2012) As sustaining the ecosystem's position often requires changes to match the developing requirements of the macro environment and customer demands, a leading company needs to have the strength to reshape processes and modify the offers. During these changes the company that is a follower is entailed to be flexible so that the leader is satisfied with the relationship and finds the company's contribution necessary. (Adner, 2017; Rubenstein, 2012)

In the following subchapter the internal and external risks will be explained and resolving measures will be suggested. Following this, a subchapter describing the attributes needed by the actors will clarify how an individual company should view and adapt their strategy. Finally, a set of generic performance indicators for ecosystem monitoring are proposed to help both the organisational and the supra-organisational strategising.

4.3.1 Risks and incentives

In chapter 3.2.3 interdependencies and complementarities are discussed. These are very important to analyse to be able to sustain the position; for the ecosystem to maintain its role in the macro environment and for the company to maintain its position in the ecosystem. According to Adner (2017), strengthening the ecosystem alignment, and so forth strengthening the position of the company in the ecosystem, is a two-step process; first, the gaps in the alignment should be recognised, and second, rectifying measures should be implemented. The ecosystem's position in the macro environment can also be improved in similar two steps: by analysing the external threats and setting high external barriers. The Five Forces analysis described in chapter 4.1.2 could once again be utilised to realise the external threats. Moore (1996) mentions three ways to establish proper boundaries for the ecosystem in order to strengthen the position of the whole ecosystem. These will be discussed later in this subchapter.

The internal risks comprise of complications in the ecosystem alignment. Adner (2017) mention two different alignment risks that cause gaps in the ecosystem: co-innovation risk and adoption chain risk. Talmar et al. (2018) describe the co-innovation risk as

the *inability* of the actors to fulfil the needed activities, and the adoption chain risk as the *unwillingness* of certain actors to contribute. Inability to contribute to the ecosystem occurs due to e.g. staffing difficulties, technological unawareness or legal issues. Unwillingness originates from poor incentives, such as poor value capturing processes, little dependency on the results of the ecosystem, too high demands from the ecosystem or indifferencies about the leadership and roles in the ecosystem. Gaps that occur due to indifferencies in the roles are more difficult to recognise, and even though they are recognised it is not always possible to change the roles, since some roles depend on the flow of activities (Adner, 2017).

In order to achieve great relationships between the actors and diminish the gaps caused by the alignment risks, mutual benefit is to strive for. There are several mechanisms to make collaboration beneficial for every included actor. Some examples are joint offerings, joint production planning and leasing contracts. (Tsvetkova et al., 2014) The *joint offering* measure can be realised by, for example, selling the products as a package deal. Returning to the example of the solar panel industry explained in chapter 4.2.2, a panel producer and a racking producer could sell their products for a cheaper package price than the parts would be on their own. This would be an intriguing offer for the customer, since it saves both money and effort while not needing to contact every component provider separately. Adding more supplementary components to the package could increase the customer value even further. This also serves every supplier in the ecosystem, since they can focus on their own area of expertise while someone else is contributing with the complementarities.

Joint production planning might e.g. be an action towards decreased costs for the partners. For example, a good practice is the just-in-time (JIT) manufacturing method (McLachlin, 1997). JIT manufacturing means that the supplier delivers its products at the time when the customer intends to use the product. This arrangement decreases the needed stock area for both parties, and many JIT producers report reduced waste as one advantage. (McLachlin, 1997) This production method requires close collaboration between the supplier and the customer, but once the process is implemented both parties will benefit from it. JIT is only one example of how joint production planning can be actualised, but it is a very descriptive example. The actors trying to develop a joint production plan needs to be closely involved in each other's working processes, and neither of the partners benefit from secrets between them.

Leasing contracts decrease investment uncertainties. (Tsvetkova et al., 2014) For industries where the investment costs are high, the initiation phase is challenging. For example, in the W2E ecosystem, the equipment needed to build a power plant require large investments, and it might be difficult to know the quality of the equipment before buying. The equipment provider can offer a leasing contract, which basically is a tenancy agreement. This gives the buyer a possibility to acquaint itself with the equipment, and if satisfied, they might buy the equipment. By being flexible, the equipment provider remains an appealing alternative.

The above-mentioned procedures will lower the risk of unwillingness of the actors by incentivising them and enforcing relationship management between the different actors. Even the inability risks are decreased because new actors are included to provide the unfulfilled components of the ecosystem, and this will enable every actor to focus on their competences. This brings us to the three measures that Moore (1996) finds the most important while reinforcing the ecosystem boundaries against external attacks.

One of the most important measures to strengthen the barriers of the ecosystem is to *offer total solutions*. By introducing new actors to the ecosystem to perform unfulfilled tasks, the ecosystem can offer a greater solution than the competing ecosystems. The solution is also trickier to mimic when the system of actors participating in the production are numerous (Porter, 1996). If the customer feels that its every need and requirement are acknowledged and satisfied by the ecosystem, the risk that the customer will consider complementing services is decreased. This is important for the ecosystem, since the risk that the customer finds a more complete ecosystem on its exploration after complementors is pressing. By offering the total solution, the customer is automatically interested to remain loyal to the ecosystem. However, Moore also thinks that further procedures to *lock the customer in* should be implemented to avoid them switching to other suppliers. The customers should be engaged in the ecosystem, and this could be achieved by e.g. offering memberships or being in touch with the customers on a daily basis. Delivering a total solution also gives a strong market position for the ecosystem, but Moore also finds that *dominating the market* is of such importance that he suggests that the company should seek for submarkets that the company could start to conquer and slowly growing the portfolio into dominating the whole market in one sector, or in other words, saturating the

market. Implementing these measures, the barriers of the ecosystem are fortified to such an extent that competing ecosystems encounter severe problems when trying to disrupt the leading ecosystem. (Moore, 1996)

4.3.2 Dynamic capability

As we could see in chapter 4.3.1, no matter whether the focal company is a keystone or a follower in the business ecosystem, they should remain flexible and collaborative, or in other words, dynamic capability is an important attribute for an ecosystem actor. Dynamic capability captures the company's understanding of the business environment and the customer needs and thereupon its willingness to adapt and to change certain ways-of-working to comply with the requirements. Dynamic capability is highlighted differently depending on which strategy the company has chosen to follow. For a leader, on the one hand, the most important capability is to constantly look for new opportunities and develop the ecosystem offering. The follower, on the other hand, needs to remain flexible towards change. Nonetheless, both the leader and the follower need both above-mentioned attributes, but how the importance is weighted differ for the different actors. A third important attribute that both a leader and a follower must have is agility (Rothwell, 1994). The organisation should have the ability to make quick decisions in order to not be left behind. (Chen, 2019)

Looking for new opportunities

In Moore's (1993) theory about the business ecosystem evolution (see chapter 3.2.4), the third stage is about finding bargaining power in the ecosystem. This is important if the leadership of the ecosystem is an internal goal for the company, but also followers that want to remain in their position should look for new and improved ways to contribute to the ecosystem value proposition. Measures to achieve bargaining power was discussed in chapter 4.3 (Rubenstein, 2012), but according to Moore (1993), constant innovation is what fundamentally drives the ecosystem forward, and hence also the company itself. Also the fourth stage of Moore's business ecosystem evolution theory require a developed innovation management process, since this stage is about self-renewal and competing against new entrants (Moore, 1993).

Adams, Bessant & Phelps (2006) have committed a systematic review of the existing research literature about innovation management. They define innovation as ". . . the successful exploitation of new ideas" (Adams et al., 2006, p. 22), and remind that there are several innovation types, e.g. product/service, process, administrative and technological innovation. The evaluation process that Adams et al. have gathered to analyse the company's innovation management process comprises seven categories of measures. The categories are inputs management, knowledge management, innovation strategy, the culture of the organisation, portfolio management, project management and commercialisation. Every category is a complex collection of important attributes, but in this thesis only one is presented in order to simplify and illuminate. The article "Innovation management measurement: A review" by Adams et al. (2006) gives a deeper insight into more ways to measure how good the company is at innovating.

Inputs management

Inputs management is concerned with the resources put into innovation, involving everything from people, finance and idea generation. A traditional measurement of this is the ratio between the expenditure or the number of people employed in the R&D team, but innovation is far wider than only R&D, and hence this is a crude measurement. A critical input for innovation is adequate funding. Therefore, a commonly used and descriptive measurement is the total expenditure, expressed either as a comparison with sales or revenue, or as expenditure by item. The disadvantage of this measurement is that it might fail to indicate whether the funding is enough or not. To prevent this narrow analysis from excluding important managerial information, several variables should be measured. (Adams et al., 2006)

Knowledge management

Knowledge management covers how ideas are gathered and implemented, and what information underlies the innovation process. This includes idea generation, ability to acquire knowledge and networking. The number of ideas generated in a set time period is a widely used measure, since ideating is the basis which innovation stands on, and generating large quantities of ideas is rather cheap. (Adams et al., 2006)

Innovation strategy

For a company to be able to innovate, an organisational strategy regarding resource allocation towards innovation should be formulated and followed. The measurements can be divided into two sub-categories; those that measure whether the company has an innovation strategy, and those that measure how effective the innovation strategy is. Measures defining whether the company has an innovation strategy or not may, to a great extent, be the same as for the inputs management, for example expenditure in R&D. The effectiveness of the innovation strategy can be measured by e.g. comparing the above-mentioned measure with industry rivals. (Adams et al., 2006)

Organisational culture

The perceived work environment plays an important role in how well the innovation process is realised. The organisational structure should be specialised, integrated and differentiated. The following characteristics specify an efficient innovation team: multidisciplinarity, a dedicated and qualified team leader, communication and cooperation between different functions, responsibility of the process and autonomy. An instrument called the Team Climate Inventory (TCI) has been developed to measure the perceived work environment, and it is conducted as a questionnaire answered by every team member (Anderson & West, 1998). This is based around four factors: participative safety, support for innovation, vision and task orientation. The *participative safety* assesses whether the staff feel included in the developing process and secure to suggest improvements. *Support for innovation* is the degree to which managers support and favour innovation initiatives. The objectives of the team should be clearly defined and shared with the whole team to achieve a pervasive *vision*. Lastly, the *task orientation* measures the commitment of the team to achieve highest performance. (Adams et al., 2006) A fifth factor, *interaction frequency*, has been suggested. This measures how often the team communicates internally and externally. (Adams et al., 2006)

Portfolio management

The innovation process requires resources even though the outcome still is uncertain. For this reason, it is important to develop a systematic process for selecting which innovation projects to focus on and which to leave at the ideation stage. The selection

criteria are complex, including choices regarding financial and vision constraints. It is a matter of optimising the trade-off between risks and returns. A widely used measure to decide if the innovation is financially profitable is the net present value. The alignment of the innovation project with the objectives of the portfolio is usually decided with qualitative approaches, such as subjective checklists. (Adams et al., 2006)

Project management

Project management pertains the processes that turn the inputs into a commercial product/service. The process of getting from the inputs to the product require a great amount of activities, and a systematic process to complete all these activities is useful for the project team leader. There are four main components that the innovation project management consists of: project efficiency, tools, communication and collaboration. *Project efficiency* can be measured by e.g. comparing the budget to the actual cost situation. *Tools* are used to separate the innovation process into discrete stages with checkpoints at which decisions regarding whether to continue or not are made. A familiar tool for many project managers is the gate model. *Communication* can be divided into internal and external communication. Concrete measures that can be applied are counting the number of internal meetings and monitoring whether external communication takes place at all. (Adams et al., 2006) *Collaboration* with other stakeholders is extremely important in a business ecosystem. The level of collaboration can be evaluated by, for example, measuring the percentage of projects that are completed in collaboration with other stakeholders (Adams et al., 2006).

Commercialisation

Commercialisation discusses how the innovation is taken to the market. In this category, the organisation is less reliant on its technical capabilities and more on the market dynamics. Commercialisation includes marketing, sales, distribution and joint ventures. This category is little researched, perhaps because many consider this category as separate from the innovation process. The measures are fairly simple, the sales personnel's adherence to a schedule being one of them. (Adams et al., 2006)

In chapter 4.2.2 different alignment strategies were discussed (Hannah & Eisenhardt, 2018). Depending on which of these strategies the focal company chooses to follow,

the innovation process takes different shapes. If a company follows the system strategy, and hence providing large part of the components to the ecosystem, they need to look for what is expected of the ecosystem and try to fit new activities into their portfolio. The portfolio management is a crucial category for this company. If the portfolio is poorly managed, the company will have difficulties seeing if there are tasks that they need external help with.

Companies following either the component strategy or the bottleneck strategy need to take extra care to constantly look for new opportunities. A bottleneck strategist is obliged to follow up on what limits the ecosystem in the near future and remain agile at every change. The company should seek to invest in many innovation projects, and in that sense, being a forerunner in how to solve a bottleneck. A company following the component strategy needs to be in constant contact with other actors in the ecosystem to maximise the common value creation. One efficient strategy for the component strategist to follow would be to initiate joint R&D projects with the other stakeholders, hence acting as the project manager of these innovation projects.

Flexibility and fit

The sustainability of a following company in the ecosystem builds on how well the company manages to remain relevant for the ecosystem. This is achieved through tight collaboration between the leader and the followers, i.e. the actors remaining flexible towards the other actors' wishes and changes initiated by others. At the same time, more traditional competition supports the follower in sustaining its position against other actors providing a similar offering. Traditional competitive advantage is achieved by locking the customers to the company's offering and finding a fit across the activities. (Tsvetkova et al., 2017) Being flexible in an ecosystem is hence a constant struggle to understand when the situation needs flexibility and cooperation, and when the individual actor should choose to raise barriers against the competitors.

There are differing views on whether collaboration and competition can be implemented in parallel with each other or if the company's strategy tend to tip to either collaboration or competition (Hannah & Eisenhardt, 2018). Hannah & Eisenhardt (2018) state that both views are correct. A company following the

bottleneck strategy is competing in the component they provide and collaborate with complementing actors. Companies following either the system strategy or the component strategy are more prone to either competing or collaborating. They conclude that faithful commitment to one strategy is what brings prosperity to the company. A company following the system strategy grows larger and more stable over time, while a company following the component strategy receives stronger collaboration relationships over time. A bottleneck company requires attentive mangers, but in turn the company becomes more agile over time, learning how a move from one bottleneck to another should be managed.

Hannah & Eisenhardt (2018) have during their study about the solar panel industry noticed a few competitive actions that can be implemented if the strategy is to lock out the competitors. The traditional view on competition described by Porter (1996) includes creating a fit among the activity alignment. Some actions increasing the competitive advantage are listed in Table 3.

If the company has chosen to proceed a collaborative approach like e.g. the component strategy, the company needs to try to find a way to create a win-win situation with the complementor. This can be achieved with measures mentioned in chapter 4.3 and rewritten in Table 3. By constantly innovating to improve the component, the position of a component strategist is also more likely to be maintained. (Hannah & Eisenhardt, 2018)

Table 3. How to remain flexible or find the fit for the company (collected from Hannah & Eisenhardt, 2018; Tsvetkova et al., 2017; Iansiti & Levien, 2004)

Competing	Collaborating
Acquire small rivals and suppliers	Share resources and knowledge
Require exclusivity from suppliers and customers	Collaborate to solve problems
Employ several suppliers to avoid dependence	Introduce common standards and integrative platforms
Lower the prices	Support the keystone actor
Provide better quality products/services than the competitors	Collaborate with competitors

Agility for implementation

During the interviews done with the consultants from PBI Research Institute (Chen, 2019), the sales process of the actors in a business ecosystem was mentioned several times. One of the consultants mentioned that their customer has an immature sales process, which means that the customer is aware of its capabilities but unable to market them to its customers. Another consultant from PBI Research Institute has worked with the same customer, noticing that their sales personnel is very restricted and unable to customise the offers to suit the customers.

This stiff sales process leads to lower profit margins than expected, and as this actor is the leader of the ecosystem, their struggle is the whole ecosystem's struggle. This thesis makes the conclusion from this statement, that the leader of the business ecosystem, the keystone player, needs to add vast resources on developing their sales process to clarify for the customers what their added value is. A logical implication would be that it is important for every actor in an ecosystem to know their value proposition and to have a developed sales process to support the information exchange between the supplier and the customer.

The above-mentioned case is a good example of how important agility of the actors in a business ecosystem is. Research has shown that being the first introducing an

innovation to the market brings competitive advantages such as greater value creation and value capturing to the introducing company. (Adner, 2006; Adner & Kapoor, 2010) If a company is agile and quick to reach decisions, it will probably be among the first introducers. Further, the introducers are usually leaders or keystone players in the ecosystem, since few innovations stand alone. Hence the introducer needs to collaborate with their suppliers and complementors so that they can progress at the same rate. (Adner & Kapoor, 2010) Agility is an advantage since the keystone position is a stable position in an ecosystem.

Rothwell (1994) has identified several factors that increase the development speed and improves the efficiency, therefore making the company more agile. Some of these factors will be explained here to act as inspiration for the management group developing the company's dynamic capabilities:

- Change to a time-based strategy. To be able to become an agile company the strategy needs to be built around this target.
- Introduce a horizontal management style. If the management levels are few, the approval process is more agile and important decisions are easier to actualise.
- Plan the product specifications prior to product development. With a high-quality initial definition with deep understanding of the customer needs, the unexpected changes are minimised.
- Combine cross-functional teams for the early development phases. Concurrent engineering reveals as many problems as possible in the initiating phase of a project, while the costs for modification are still low.
- Update the component database. A database with updated information about components and materials and preferred suppliers facilitates the design process.
- Use simulation modelling instead of prototyping. Simulation programs reduce the number of needed physical prototypes, thus saving both money and time.

By implementing some of the above-mentioned actions (or any of the actions mentioned in Rothwell's article "Towards the Fifth-generation Innovation Process" (1994)), the company will be more adaptable and reach important conclusions more easily. This makes the company flexible, and the other actors in the ecosystem will

find it effortless to collaborate with the company. Consequently, the company is a desirable member of the ecosystem.

4.3.3 Performance indicators

The establishment of performance indicators promote sustainability and leads to larger value creation, and the indicators also help managers to monitor the success of their chosen strategy. The field of enterprise performance measurement is well defined and detailed, with the balanced scorecard as a familiar example. However, adequate performance indicators for ecosystems are still in the development phase. (Graça & Camarinha-Matos, 2017) Iansiti & Levien (2004) have introduced a definition of the health of the ecosystem, which provides us with a lead on which attributes that would be sensible to measure to understand what effect the single company has on the whole ecosystem. Graça & Camarinha-Matos (2017) have reviewed different research areas like e.g. collaborative networks, social networks and supply chains to see if these areas could contribute with supporting elements to use when developing business ecosystem performance indicators.

An immensely important question is how the health of a business ecosystem should be measured. Iansiti & Levien (2004, pp. 43- 57) suggest that the health of the system should be measured on how well the whole system creates opportunities for each of its actors. The ecosystem should offer possibilities for its actors to innovate, but it is not enough if the ecosystem is disrupted at the first sight of a change in the business environment. Hence, the measures that Iansiti & Levien (2004) suggest to describe the health of the system are *productivity, robustness* and *niche creation.*

An analysis of the health of the business ecosystem should be initiated by simplifying the complex system. Iansiti & Levien (2004) suggest dividing the ecosystem actors into subcategories performing similar activities in the ecosystem. Returning to the solar panel industry example that Hannah & Eisenhardt (2018) use in their article, the subcategories mentioned in chapter 4.2.2 were solar panel producers, racking producers, installers, sales and design professionals, and financiers. This is one way of dividing the actors of a versatile ecosystem, but there are naturally several ways to

divide the actors, depending on the actors included in the ecosystem and occasionally even what kind of analysis that is to be performed.

All these subcategories might include several actors performing equal tasks, and the subcategories might even equate to conventional industries. The subcategories of the actors might be shared by numerous ecosystems. However, every actor in a subcategory, in one way or another, affects the health of the ecosystem, and so forth also the productivity of the focal company. (Iansiti & Levien, 2004)

Iansiti & Levien (2004) uses the following analogue to develop a suitable productivity measure for an ecosystem: "How effectively does the ecosystem convert raw materials into living organisms?" (Iansiti & Levien, 2004, p. 46) A business ecosystem is constantly exposed to changes in the environment, usually in the form of new technologies, new processes and changed demands. The productivity measure should therefore encapsulate how well the ecosystem manages to innovate and offer lower costs and new products to their customers.

The concrete measurements that Iansiti & Levien (2004) suggest using for evaluating the *productivity* of the ecosystem is returns on investments, or ROI. By collecting a list of the actors and their ROI values, the average ROI for the whole ecosystem or for the separate subcategories can be calculated. This average value can be, for example, compared to other ecosystems' values to see how well the ecosystem performs in turning investments into profits, or then the health evolution over time can be noticed by comparing the average ROI from year to year.

Since a healthy business ecosystem survives a disruption of the macro environment, a measurement on the *robustness* of the ecosystem should be included in the health analysis. In a robust ecosystem the actors are encouraged to compete for the crucial components of the ecosystem's value proposition, and this triggers growth and decreases the ecosystem's dependence on the leader (Moore, 1993). A robust ecosystem is dynamically following trends like new technologies and higher demands from the customers. A company planning to join an existing ecosystem could consider analysing the survival rates of the ecosystem. This could, for example, be measured by looking at the number of firms in the subcategories over time. The number of firms could also be compared between different subcategories in order to see which category profits most when the ecosystem is flourishing. Analysing the events leading to dips

in the number of firms will provide the company valuable information on what to expect during difficult times. (Iansiti & Levien, 2004)

In order to increase the value captured by the ecosystem and so forth make the ecosystem stronger, the value creation should grow. This indicates that new members should constantly be invited. Adding actors that perform exactly the same activities as existing actors is self-destructive, since one of the core values of a business ecosystem is to collaborate to bring higher value to the customers. For this reason, a healthy ecosystem is a system that is developing new needed functions. Iansiti & Levien suggest this measurement to be called *niche creation*. So forth, a healthy ecosystem has a growing number of firm variety and offering variety. It is of great importance that the new functions are meaningful for the ecosystem value proposition. (Iansiti & Levien, 2004)

To explain the niche creation, an example from the people transportation ecosystem could be mentioned. In bigger cities with long distances between places it is important to be able to move flexibly. Buses, trains, trams and taxis offer a good basis for this. However, the buses, trains and trams are not very flexible, since they follow a decided route and timetable. Taxis, on the contrary, are usually very expensive to use and so forth not reasonable to use if you are to travel shorter distances. Here is the opportunity to include a new niche into the ecosystem. It should offer a possibility to move flexibly, not depending on any routes or timetables, and it should be cheaper than taxis. In several cities this people transportation ecosystem has lately been complemented by electrical scooters and bikes that you can take from place A and leave at place B for a small amount of compensation. The people transportation ecosystem renews itself and follows trends and could thereby be defined as a healthy ecosystem.

The performance indicators mentioned by Iansiti & Levien (2004) in their health measurement process evaluate the whole ecosystem. The companies involved in the ecosystem could also be further evaluated to discover their position and how valuable they are for the ecosystem. Graça & Camarinha-Matos (2017) suggest using performance indicators from the social network and value network research. They also found that indicators implemented in supply chains are useful in a business ecosystem setting.

Value creation

Implementing performance indicators that support the monitoring of the end user needs, the macro environment and the internal capabilities is crucial. This will help the companies to notice if the value proposition should be adjusted in any way. Setting up suitable performance indicators is preferably done during the value creation phase of the ecosystem strategising, when the needs and the environment are uncovered.

To measure how the company contributes to the ecosystem, centrality in and centrality out degrees could be monitored. These degrees could be measured by e.g. counting the incoming and outgoing deliverables per actor. Value network analysis further divides the deliverables into tangible and intangible, and by looking at the percentage of these deliverables per actor, the single actors value creation process can be analysed. (Graça & Camarinha-Matos, 2017)

Value capturing

Even for value capturing the same idea about deciding the performance indicators during that particular phase applies. The social network research contributes with measures for structural analysis. The structure from the focal company's point-of-view could be measured by investigating the centrality of the company. The number of connections per actor could show how embedded the company is in the ecosystem, i.e. how dependent the company is on the ecosystem outcome. The value network analysis takes this embeddedness to another level and measures the percentage of the channels that actually are used. This indicates how effectively the company uses the opportunities that is provided to it through participating in the ecosystem and how well it manages to capture the value provided to it. (Graça & Camarinha-Matos, 2017)

The value network research has implemented a cost/benefit indicator. This indicates how a particular transaction affects the assets of the company. (Graça & Camarinha-Matos, 2017) By monitoring this indicator the company could understand if they are gaining an adequate part of the total profit compared to their contribution

Maintain the position

Concrete indicators for monitoring of how well the company manages to remain competitive inside the ecosystem is of great importance to be informed if changes should be implemented. The value network research suggests measuring the perceived value of the deliverables, both from the sender's and the receiver's view (Graça & Camarinha-Matos, 2017). Investigating the perceived value is crucial since it is important that the reputation of all the actors in the ecosystem is good, or else the whole ecosystem might suffer losses due to the notorious actor. This statement was validated in the analysis made by Hannah & Eisenhardt (2018). Saturn, one of the successful actors in their solar panel ecosystem example, chose to collaborate with large firms exclusively. These firms deliver high quality and have robust track records, and by including these into Saturn's ecosystem, equity investors were attracted to that ecosystem. Pluto, the least successful solar panel ecosystem actor, chose to let struggling firms be their complementors. This increased the difficulties for Pluto to find funding for its ecosystem, since the complementing actors brought such poor reputation with them. The perceived value could be measured in several ways, and Morgan & Rego (2006) suggest to construct a scorecard including average customer satisfaction, Top 2 Box satisfaction, proportion of customers complaining and repurchase intent for monitoring and predicting business performance. The data for this scorecard could be collected via customer surveys. (Morgan & Rego, 2006)

Finding bottlenecks in the ecosystem is extremely important in order to increase the efficiency of the ecosystem. A measure used in the value network analysis to spot bottlenecks is to follow up on the transaction time of both tangible and intangible deliverables. The supply chain and demand chain management research measures lead time, which is the time between initiation and completion of a process, including value adding time and waiting time. By decreasing the lead time, the whole supply chain becomes more competitive. (de Treville, Shapiro, & Hameri, 2004) The lead time *per se* is difficult to implement on business ecosystems, since the actors in an ecosystem are more intertwined than the supply chain actors and the collaboration between the actors are not restricted to only material deliverables, but the theory could be adjusted and work as an inspiration source to develop a measurement that suits ecosystems better.

4.4 SUMMARY OF THE 3I-FRAMEWORK

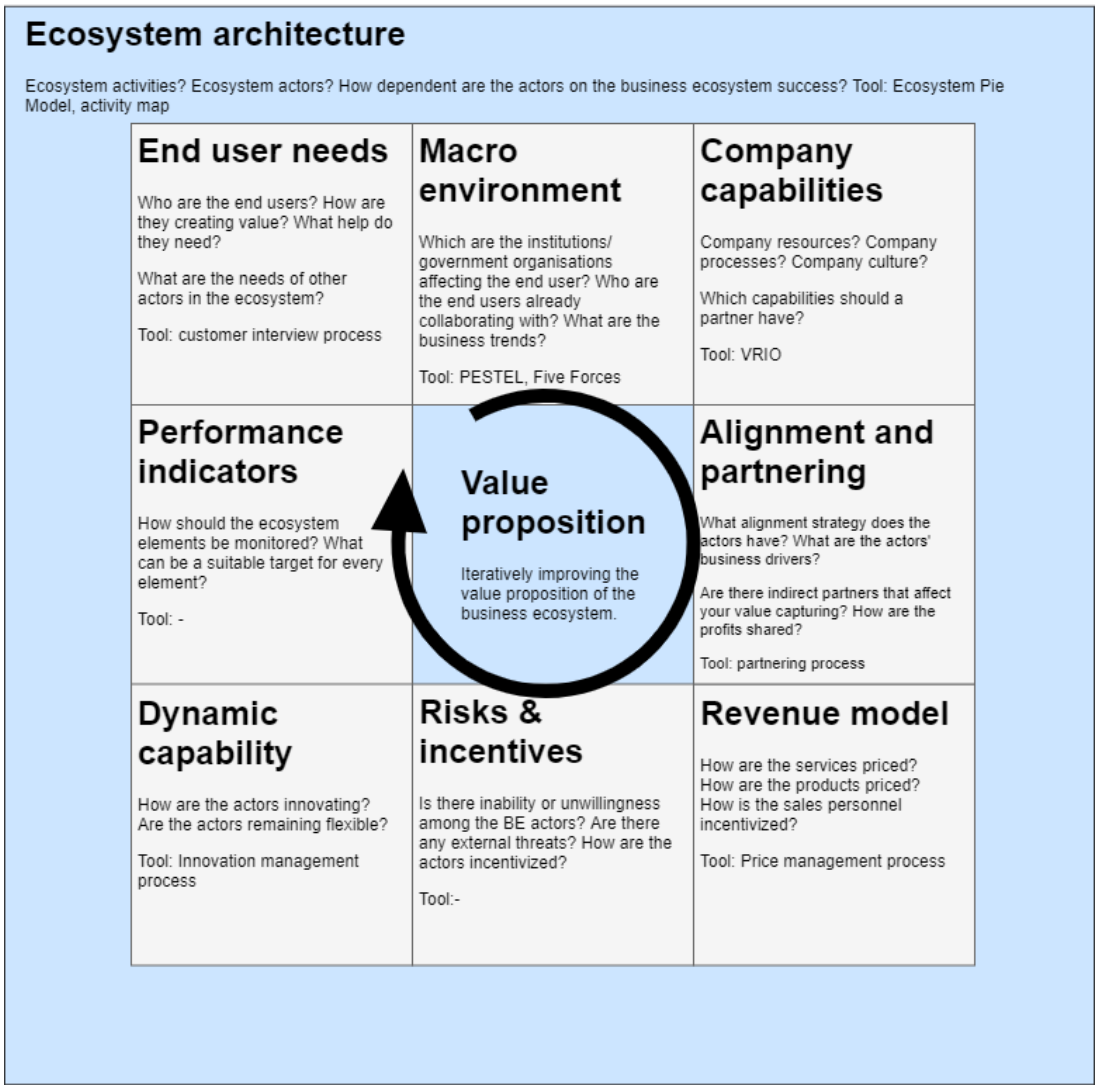


Figure 9. Business Ecosystem Canvas.

To unite the framework and illustrate the complexity of the ecosystem, a business ecosystem canvas has been assembled (see Figure 9). The canvas is built around the final value proposition of the ecosystem, and the steps leading to the value proposition are gathered around the value proposition. Everything in the ecosystem is supported or limited by the ecosystem architecture, which is why it is added as a frame to the canvas. The steps are included in one ensemble; an ecosystem entirety, every step providing input to the other steps. The order of the steps is logical, but the user of the canvas might choose to implement the canvas as they see fit. The questions in the boxes are indicative and should support the initiation of the thinking process. The tools described in the previous subchapters are also added in the boxes.

5 CONCLUSIONS

This thesis points at the complexity of business ecosystems. The ecosystem can be analysed on two different levels: the company level and the supra-organisational level. This should be acknowledged in order to avoid confusion when several participants do their own analysis separately from each other. It should be clarified from the beginning if the analysis is to be conducted to answer the company what its position in the ecosystem is, or if the analysis is performed to provide the ecosystem actors with information about how the coopetition should be realised. In conclusion, the ecosystem analysis can answer several important questions both for the individual company and for the whole business ecosystem.

The framework in this thesis, the 3I-framework, has been developed through an exhaustive literature review. A case analysis was conducted to reevaluate if the framework covers the paramount elements (the case analysis has been excluded from the final thesis due to confidentiality issues). The 3I-framework contributes with a detailed working process for managers interested in strategising in the business ecosystem. Using the framework and considering the business ecosystem might reveal potential future partners, new business opportunities or where the bottlenecks in the existing ecosystem are.

The 3I-framework and the business ecosystem canvas developed in this thesis are supportive tools that can be used as guidelines. Many of the analysis steps are processes that managers and business leaders are familiar with, which makes the implementation of the framework straightforward. It is also easy to adjust the framework. If the company for example already has developed another process for analysing the macro environment than the PESTEL framework, the step can certainly be exchanged to the preferred process if it covers all the important factors.

The performance indicators that should be used in a business ecosystem are equally complex as the ecosystem itself. Developing a system of measures that are indicating the performance of the ecosystem is very difficult, if not only for the complexity of the system, but also for the fact that the actors in the ecosystem might value different things. Using the 3I-framework to discover what is important for the current actor and

its ecosystem can introduce valuable perspectives for the process of deciding what to measure.

A discussion that can be held about the performance indicator topic is whether it is more important to measure the performance of the ecosystem as a collective or the position of the company in the ecosystem. Today, most managers might consider their own company's success the most important. However, when they understand the advantages of having a united business ecosystem working towards a common goal, it might become apparent that, by helping the other actors the company will gain a part of the common success.

Due to the complex nature of business ecosystems, the 3I-framework might be incomplete. Simplifications are made to be able to bring the framework to a level that is possible to apprehend. For example, the analysis is possible to execute internally in the company to provide the company with an elementary picture of the ecosystem. However, to gain a detailed and practical view, other ecosystem members should be involved in the analysis. To be able to collaborate effectively during the analysing phase, affirmed supra-organisational procedures and processes should be applied. These procedures and processes are left out of the 3I-framework. Further research should be carried out to develop procedures that are customized for large ensembles like the business ecosystem. The thesis author suggests considering meeting and workshop procedures that enable many parties to express their opinion during one occasion.

Further research should be conducted to validate the framework. The supra-organisational procedures should be added as a further level to the analysis, and it should be clarified if any important elements are left out from the 3I-framework. As the 3I-framework is developed on a generic level it still might cause confusion amongst the managers using it. Therefore, validating and concretising the framework through additional case studies could aid when implementing the 3I-framework.

6 SWEDISH SUMMARY – STRATEGISKT RAMVERK FÖR AFFÄRSEKOSYSTEM

6.1 INTRODUKTION

Affärsekosystem är en rätt så ny syn på hur företag samarbetar för att uppfylla slutkundens behov och önskemål så bra som möjligt. Konceptet utvecklades av James Moore i början av 1990-talet då han insåg att företagens konkurrensfördel inte endast är beroende av deras erbjudna produkt eller tjänst, utan även hur involverade de är i ett nätverk av olika värdeerbjudanden påverkar minst lika mycket. Efter att Moore införde analogin mellan ett biologiskt ekosystem och ett affärsnätverk har synen utvecklats, och flera olika ramverk för hur ett affärsekosystem är uppbyggt har sammanförts. Tyvärr är många av dessa ramverk endast teoretiska, och det är svårt för affärsledare att tillämpa dem i sin egen verksamhet. Det här diplomarbetet strävar därför efter att bygga upp ett ramverk som är konkret genom att besvara de följande forskningsfrågorna:

1. Vilken sorts data ska företagen samla in för att kunna analysera sina nuvarande och kommande affärsekosystem samt företagets strategiska position i affärsekosystemet?
2. Hur kan företaget använda insamlade data för att bibehålla eller förbättra sin strategiska position?

För att utveckla ramverket har en noggrann litteraturstudie utförts, och med hjälp av en retrospektiv fallstudie (som har uteslutits ur arbetet på grund av den konfidentiella informationen) har ett antal välkända strategiska verktyg plockats fram och införts i en affärsekosystemomgivning. Ramverket är en konkret process som kan användas iterativt som stöd för affärsledarna då de ska fatta strategiska beslut.

6.2 METODOLOGI

Det här diplomarbetet är ett försök till att sammanföra akademisk forskning inom affärsekosystem med bekanta strategiska verktyg från affärsvärlden. Diplomarbetet

bygger på tillämpad forskning, och bidrar därför till den evidensbaserade ledarforskningen. Primära och sekundära data har sammanställts. De primära data består av intervjuer med ledarskapskonsulter samt resultat från diskussionstillfällen med forskare inom ämnet affärsekosystem. De sekundära data har sammanställts genom en semi-systematisk litteraturstudie och fallstudier.

6.3 LITTERATURSTUDIE

Ett enskilt företag har sällan alla de resurser och förmågor som behövs för att leverera det fullständiga slutliga värdet åt kunden. För att tillfredsställa alla kundens behov måste företag samarbeta, och därför behövs konceptet ekosystem. För att påvisa varför affärsekosystem är ett koncept som behövs, har två andra välkända koncept diskuterats: värdekedja och distributionskedja. I en värdekedja beaktas endast företagets interna aktiviteter och hur väl dessa är optimerade. Denna syn på företag utesluter fullständigt makroperspektivet med samarbete mellan fler aktörer. I en distributionskedja beaktas nog alla de aktörer som är direkt involverade i materialflöden, men aktörer som producerar kompletterande produkter och tjänster har uteslutits. Dessa finns med i affärsekosystemet, och därtill beaktas även myndigheter och andra institutioner som vanligtvis inte beaktas i en affärsverksamhet. Andra fördelar med att samarbeta för att skapa mervärde är att dela på riskerna, det uppstår bättre möjligheter att komma på innovativa lösningar samt att dela på det sociala ansvaret.

I ett affärsekosystem finns det fyra viktiga element som allting bygger på: aktörer, deras aktiviteter, deras positionering samt hur de är förenade tillsammans. Aktörerna kan vara såväl organisationer som olika avdelningar i företagen. Alla aktörer ska ha ett eget värdeerbjudande. Aktörerna kan vara förenade genom överföring av material, information, influenser samt pengamedel.

Aktörerna kan ha olika roller i affärsekosystemet. De kan vara *ledare* av ekosystemet, då är de ofta de som sammanför företagen samt upprätthåller samarbetet. Aktörerna kan även vara i en *dominerande ställning*, då tar de ofta upp en stor del av marknaden men försöker ändå undvika ansvaret av att skapa sammanhållning. Aktörer som håller

sig till sin egen *nisch* erbjuder endast det de är bra på, och är såvida relativt begränsade ifall ekosystemet går under.

Ett ekosystem är ett löst nätverk av dessa aktörer, som sammanbinds av ömsesidigt beroende och kompletterande erbjudanden. Det ömsesidiga beroende är lätt att hantera, då många företag är vana vid att samarbeta med sina distributörer och kunder. De kompletterande erbjudandena är inte lika lätta att styra. Det är svårt att ha kontroll över vad ett stort antal aktörer, som traditionellt sett inte har behövt styras, gör. Som tur kan sådana kompletterande erbjudande som är generiska uteslutas, dvs. sådana aktörer som är lätta att styra behöver inte inkluderas i analysen. Till exempel eldistributörer har ett generiskt kompletterande erbjudande. Med de aktörer som har ett unikt kompletterande erbjudande kan sedan ett ömsesidigt förtroende byggas upp genom att till exempel samarbeta inom forskning och utveckling.

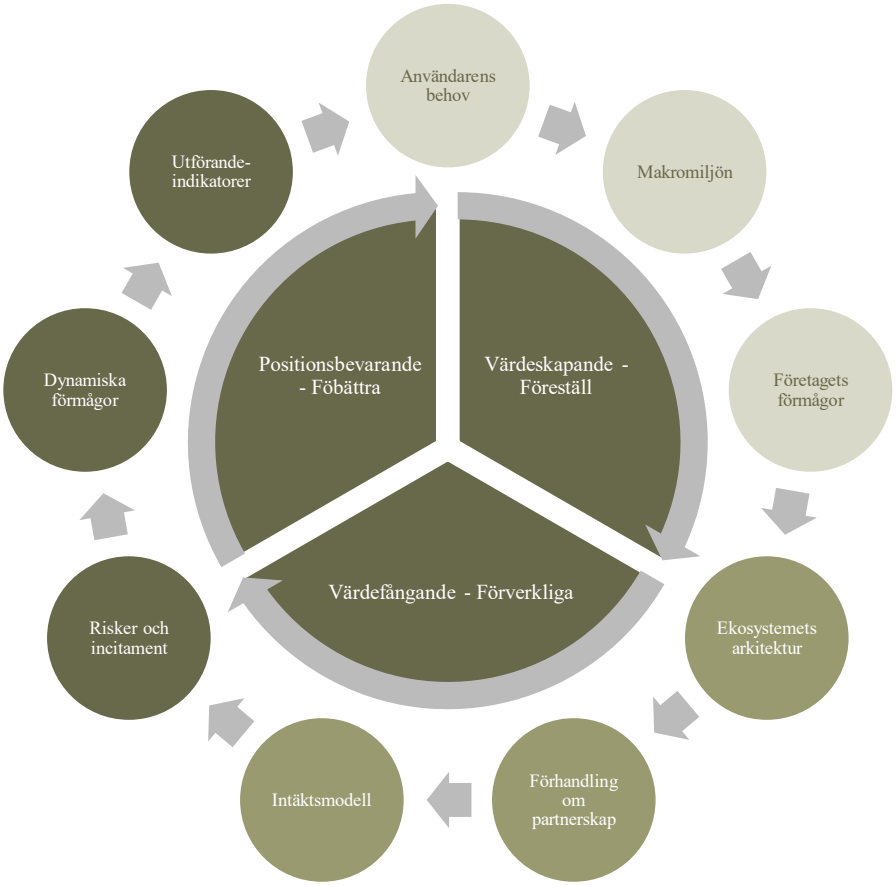
Så kallade flaskhalsproblem uppstår ofta i dessa affärsekosystem. Dessa flaskhalsar begränsar produktionen, och flaskhalsens positionering i ekosystemet inverkar olika på den centrala aktörens erbjudande. Det är viktigt att hitta flaskhalsarna för att snabbt kunna åtgärda dem innan konsekvenserna är förödande. En ekosystemanalys möjliggör att flaskhalsarna identifieras.

Flaskhalsar är ett av de problem som begränsar aktörerna som är delaktiga i ett affärsekosystem. I ett ekosystem kan det även finnas andra hinder som gör utvecklingen långsammare, till exempel normer, regler och rutiner. Andra aktörer kan införa risker i ekosystemet, till exempel ifall de är oförmögna att utföra sina uppgifter eller om de har meningsskiljaktigheter med den ledande aktören i ekosystemet. Ekosystemet är väldigt beroende av dess ledande aktör, och denna aktörs beslut påverkar alla som är involverade. Därför är det viktigt att den ledande aktören får allt stöd den behöver.

6.4 3F-RAMVERKET

3F-ramverket (se figur 1) bygger på tre faser i affärsekosystemets evolution: värdeskapande, värdefångande och positionsbevarande. Under den värdeskapande fasen föreställer sig aktörerna hur ekosystemet ska vara uppbyggt och vad dess mål är.

Den värdefångande fasen innebär att planerna förverkligas genom att aktörerna introduceras för varandra och samarbetet inleds. I den positionsbevarande fasen kommer aktörerna att göra sitt yttersta för att förbättra ekosystemet samt dess erbjudande. Det här ger 3F-ramverket: föreställ, förverkliga och förbättra. Ramverket ska beaktas iterativt, och de strukturerade stegen kan utföras i annan ordning, och även parallellt, ifall situationen kräver.



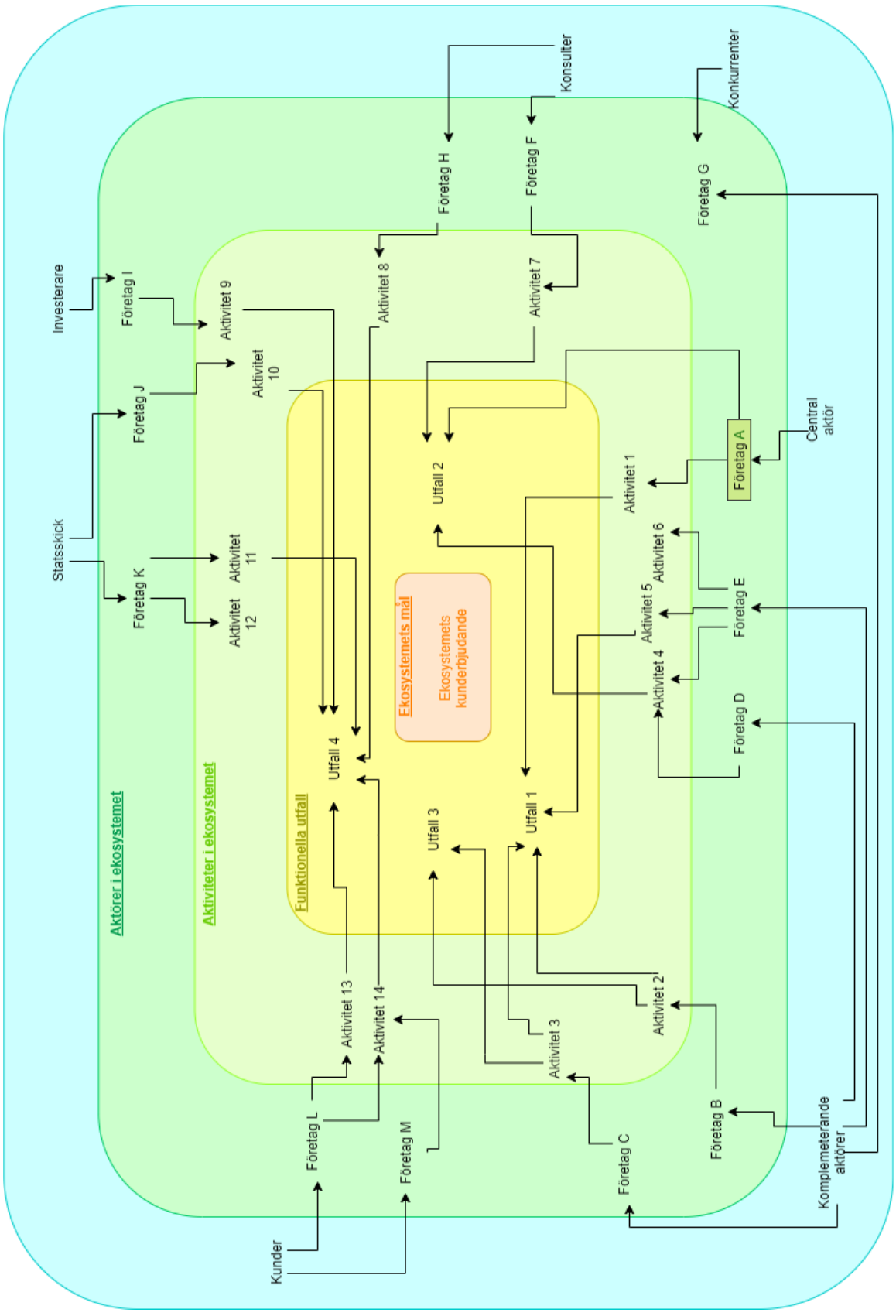
Figur 1. 3F-ramverket

Den första fasen innebär att bestämma hur värdet ska skapas, och en bra utgångspunkt för att avgöra detta är att börja med att höra med slutkunden vad den behöver. Detta kan göras genom att intervjua de befintliga kunderna samt deras kunder. En öppenhet mot nya kundsegment möjliggör att nya behov kan uppdagas. Då dessa intervjuer utförs är det viktigt att fråga rätt frågor. Istället för att fråga ”vad behöver ni?” borde kunderna ombes att förklara sin arbetsprocess och hur de skapar värde. Då ligger ansvaret för att vara den som kommer på lösningen till kundernas verkliga problem hos distributören, istället för att kunderna själv ska hitta på vad de behöver för lösning.

Makromiljön är den omgivning som företagen utövar sin verksamhet i. En förståelse för den här miljön kan verka inspirerande, men det är samtidigt nödvändigt att förstå vilka faktorer som påverkar verksamheten. Då makromiljön analyseras bör politiska, ekonomiska, socio-kulturella, tekniska, ekologiska samt juridiska frågor behandlas. Därtill är det viktigt att överväga alla konkurrerande krafter som kan påverka verksamheten negativt. För detta kan till exempel Five Forces-analysen, utvecklad av Porter (2008), användas. Denna analys inkluderar existerande konkurrenter, nya konkurrenter, ersättande konkurrenter, samt utmanande distributörer och kunder.

För att företaget ska kunna motivera sin position i affärsekosystem samt hitta de rätta medspelarna måste det ha en tydlig uppfattning om dess förmågor och resurser. Dessa förmågor ska uppfylla följande krav för att ge företaget konkurrensfördelar: de ska vara värdefulla, sällsynta, svåra att imitera och anpassade till företagets verksamhet.

Efter detta ska affärsekosystemet struktureras: vem ska utföra vilken uppgift och vem är de samarbetspartners med? Hur ska samarbetet förverkligas? Nu inleds den värdefångande fasen. I det första steget ska en karta över alla aktörer och deras aktiviteter framställas för att alla medlemmar ska kunna bilda sig en uppfattning om hur ekosystemet verkar. Tsvetkova et al. (2017) har utvecklat en aktivitetskarta som kan användas som utgångspunkt då ekosystemet undersöks (se figur 2).



Figur 2. En aktivitetskarta för ett affärsekosystem (Tsvetkova et al., 2017).

Alla aktörer måste känna till sin egen alliansstrategi: systemstrategin, komponentstrategin eller flaskhalsstrategin. Systemstrategin går ut på att ett företag erbjuder ett stort antal av komponenterna som behövs för att förverkliga värdeerbjudandet. Konkurrenskraftiga lösningar och exklusivitet är stora delar av denna strategi. Komponentstrategin däremot utgår ifrån att ett företag erbjuder en komponent. Företaget är ofta expert inom den komponenten, och det behöver starka samarbetspartners som kan leverera resten av komponenterna. Flaskhalsstrategin handlar om att företaget försöker lösa flaskhalsarna i ekosystemet genom att snabbt finna effektiva lösningar till problemen. Dessa företag måste sitta på mångsidig kunskap, och de måste vara flexibla så att de kan agera direkt då nya flaskhalsar uppstår.

Oberoende vilken alliansstrategi företaget väljer är de ändå tvungna att samarbeta med någon annan aktör inom ekosystemet. En idealpartner har en samarbetsvillig strategi, är förändringssökande och är delaktig i endast ett affärsekosystem. I inledningen av samarbetsdiskussioner måste båda parter vara medvetna om sina affärsdrivkrafter. Därtill ska båda parterna sträva till att bygga upp en välfungerande helhet. För att följa upp hur samarbetet framskrider ska olika prestationsindikatorer fastställas och övervakas. Inom affärsekosystem kontaktas även andra intressenter än de direkta kontakterna, och en plattform är ett välfungerande koncept för att alla aktörer ska kunna dela med sig av sin kunskap och sina erfarenheter utan större ansträngning.

För att företagen ska kunna fånga värdet som affärsekosystemet genererar ska alla aktörer ha en tydlig och välmotiverad intäktsmodell. Det finns såväl traditionella som mer innovativa intäktsmodeller. De traditionella grundar sig antingen på att det sätts ett fast pris på sitt erbjudande, eller så prissätts erbjudandet genom att beräkna kostnaderna och lägga till en överenskommen vinstmarginal på priset. De mer innovativa prissättningsmetoderna grundar sig mer på att värdet som kunderna får av att införskaffa erbjudandet tas i beaktande. Prisnivån kan definieras beroende på hur mycket kunden använder erbjudandet, eller ifall prestandan av erbjudandet är viktig kanske den kan användas som utgångspunkt då priset bestäms. En sista modell är att erbjudandet prissätts utgående från hur kunden uppfattar det tillförda värdet av erbjudandet.

En viktig del av ekosystemet är att överväga hur värdet som ha skapats ska fördelas rättvist mellan aktörerna. Detta är inte en lätt uppgift, då aktörerna kan bidra med såväl materiella som immateriella erbjudanden. Det är viktigt att uppdelningen diskuteras noggrant i ett tidigt skede av samarbetet, och att alla deltagare är överens. En metod som kan användas för att dela värdet rättvist är Shapleys mängd (Teng et al., 2019).

För att affärsekosystemet ska fortsätta vara lukrativt måste det förbättras med ett långsiktigt perspektiv. Till att börja med innebär det här att identifiera interna och externa risker, samt att försöka åtgärda problemen innan de leder till några värre konsekvenser. De interna riskerna beror på de involverade aktörerna och deras oförmåga och/eller ovilja till att bidra. För att undvika att dessa risker realiseras måste kontinuerliga diskussioner upprätthållas för att hitta de aktörer som eventuellt kan skapa problem, och sedan ska dessa aktörer stödas genom olika samarbeten som skapar incitament för förbättring. Externa risker beror på förändringar i makromiljön. För att skapa så höga murar som möjligt kring ekosystemet för att skydda det från externa attacker, ska till exempel helhetslösningar erbjudas för att skapa ett slutet förhållande till kunderna. Ett annat sätt att bygga upp starka murar mot utomstående hot är att ha en dominerande ställning på marknaden.

Dynamiska förmåga är en viktig egenskap hos en medlem i ett affärsekosystem. Detta innebär att aktörerna ska vara flexibla, de ska ha en god förståelse för makromiljön samt deras företagskultur ska möjliggöra snabb förändring och anpassning. En dynamisk aktör är nyfiken och söker konstant efter nya lösningar och affärsmöjligheter. Detta innebär att företaget ska ha en välutvecklad innovationsprocess. För att bibehålla flexibiliteten är det viktigt att företaget hittar en balans mellan samarbete och konkurrens med de andra aktörerna. För att vara en smidig aktör då förändring är aktuellt i ekosystemet, kan företaget till exempel förändra sin organisationshierarki till en mer horisontell modell eller upprätthålla en uppdaterad databas med nödvändigt material och vem som är distributören. Dessa åtgärder gör att företaget är lättare att samarbeta med då snabba beslut måste tas.

För att kunna följa upp hur samarbetet i affärsekosystemet framskrider är det viktigt att definiera en samling utförandeindikatorer. Till exempel kan ekosystemets hälsa mätas genom att följa upp dess produktivitet, hur robust det är och hur många nya nischer det möjliggör. Den individuella aktörens position i ekosystemet kan följas upp

med hjälp av indikatorer som har utvecklats inom nätverksforskningen. Antalet kopplingar som företaget har till de andra aktörerna berättar något om hur integrerad företaget är i ekosystemet, andelen av dessa kopplingar som aktivt utnyttjas säger däremot hur engagerad företaget är i samarbetet. Hur företaget bidrar till ekosystemet kan mätas med antalet transaktioner som företaget gör eller får. För att affärsekosystemets rykte ska hållas gott är det viktigt att de enskilda aktörerna även har ett gott rykte. Aktörernas rykte kan uppföljas genom att fråga samarbetspartners om deras uppfattning om värdet som företaget bidrar med. För att hitta flaskhalsarna kan transaktionstiderna för alla aktörer följas upp. Detta borde avslöja vilken aktör som bromsar upp hela systemet.

6.5 DISKUSSION

Det här diplomarbetet stöder strategiarbetet i ekosystem, både på företagsnivå och på ekosystemnivå. 3F-ramverket är antagningsvis enkelt att använda då många av de inkluderade processerna är välbekanta för företagsledare. Ramverket fungerar som en detaljerad arbetsprocess för ledare som analyserar affärsekosystemet som deras företag är del av eller vill bli del av. Det kan även användas som inspirationskälla då utförandeindikatorer ska utvecklas. Däremot är 3F-ramverket högst troligt bristfälligt på grund av den korta tidsramen och författarens obefintliga erfarenhet av strategiskt arbete inom företag. Vidare forskning borde utföras för att bekräfta samt förbättra ramverket.

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8 APPENDIX

The five forces mentioned in Porter's framework are the following (see Figure A): existing competitors, new entrants, suppliers, buyers and substituting products and services. The existing competitors share the value created in the ecosystem, while the suppliers and the buyers have the power to take a share of the value and the possible new entrants and the substitutes might limit the value creation with their actions (Porter, 2008).

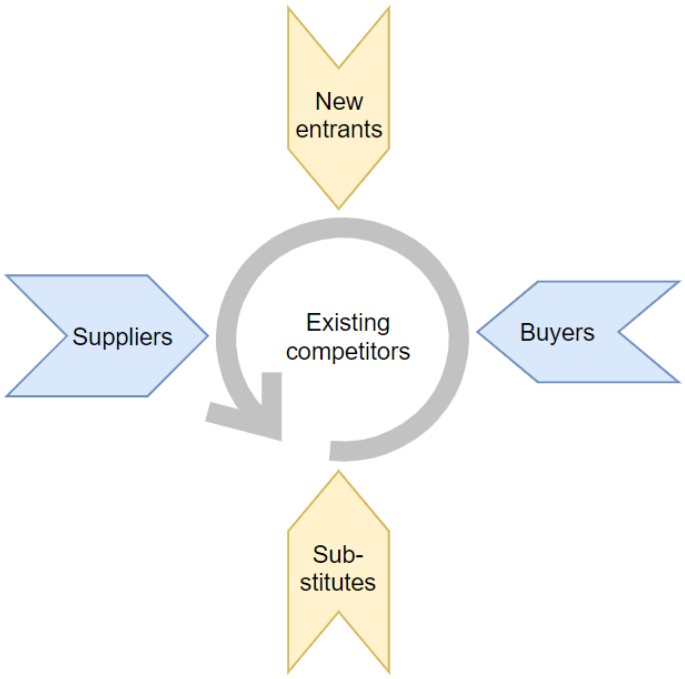

Figure A. The Five Forces (Porter, 2008).

The first force in the framework is the **threat of entry**. New competitors bring fresh knowledge and capabilities to the market while desiring to gain market share. Already the *threat* of new entrants limits the incumbents' profitability. When the threat of new competitors is high, the incumbents need to keep their prices low in order to limit the possibilities to enter with a competing price. For the incumbents it is possible to keep the prices down through for example *supply-side economies of scale*. When the focal company buys large amounts of the supplier's products, it can command better terms and the costs can be divided on more units. This is one of the entry barriers that benefits the incumbent over the new competitors. Another barrier is the *demand-side benefits of scale*. This barrier arises due to network effects: a customer is more willing to buy

from producers that many other users also prefer. The customer usually opts a familiar producer over an unknown actor in the field. Apart from the familiarity of an incumbent in the field, the customer also faces fixed *customer switching costs* when they change their supplier, including for example costs for retraining the employees to use the new product or for possible changes in the processes. For the new entrants, the *capital requirements* might limit the entry. The entrant needs to for example build an inventory or fund the losses caused during the start-up stage. There are also barriers that are *independent of company size*. An incumbent, for example, might own a patent on a technological solution or favoured access to the best raw material sources, and the knowledge collected during its operating lifetime gives the incumbent a noticeable head start. The *unequal access to distribution channels* is another issue that the new entrants need to solve when entering a new industry, and the worst-case scenario would be that the entrant needs to create new channels on their own. *Government policy* might both limit and simplify the entry; on the one hand the government might, for example, require licenses that are difficult to acquire, or on the other hand it might subsidise the new actor. (Porter, 2008)

The following list is to summarise the barriers Porter (2008) mention that new competing actors must overcome to enter the market and that incumbent actors can benefit from when trying to maintain their position:

- Supply-side economies of scale
- Demand-side benefits of scale
- Customer switching costs
- Capital requirements
- Advantages independent on company size
- Unequal access to distribution channels
- Restrictive government policy

The second force is the **power of the suppliers**. The suppliers have extensive power over the value captured by the focal company, since they set the price and decide on the quality of their deliverables. The supplier groups are especially powerful if they are more concentrated than their buyers. Another factor that makes the suppliers powerful is who they sell to; a supplier group that sells to various ecosystems have more power than a supplier that serves only one ecosystem. The buyers also suffer

from the fact that shifting costs will occur if they change their suppliers, the buyer having to, for example, re-educate their staff or re-locate closer to the new supplier. If the supplier offers a unique product/service, the buyer also has less to say about the price. Moreover, if the offering of the supplier is adaptable and the focal company cannot pay the correct price, the supplier might by-pass the focal company and sell directly to the end-user. This might decrease the captured value of the focal company. (Porter, 2008)

The factors that makes a supplier group powerful are for instance the following:

- Higher concentration of suppliers versus buyers
- Increasing number of buyers
- High supplier shifting costs
- Unique supplier offering
- Supplier integration possibility

The **power of buyers** is the third force. The buyer can either be the end customer or an intermediate customer. The analysing process is mostly the same for these buyer groups, with one difference that will be mentioned in the end of this section. The customers can exercise their power by demanding lower prices or better quality of the product/service. The buyer groups can either have *negotiation leverage* or be *price sensitive*. (Porter, 2008)

The focal company has little to say during negotiations if the buyers are few in numbers or if they buy large volumes. Additionally, if the focal company offers standardised or undifferentiated products, the buyer also has more power during negotiations. Lastly, low switching costs or if the buyer can make the product themselves also puts the focal company in an unfortunate situation during negotiations. (Porter, 2008)

The focal company needs to be considerate when setting their prices if their customers earn low profits. Also, if the focal company offering has little effect on the quality of the customer's product/service, the buyer might also be price sensitive. Furthermore, if the price of the focal company offering is a large part of the customer's total cost or if the offering in no way affects the other costs, the customer also becomes price sensitive. (Porter, 2008)

As mentioned earlier, there is one minor detail that needs to be considered when analysing an intermediate customer. An intermediate customer buys the product/service of the focal company and sells it further to the end user. The important detail that should be considered is the influencing power the customer has on the end user's decisions. (Porter, 2008) Considering the fact that the intermediate customer probably has a great number of customers, this intermediate customer is most likely one of the most powerful buyers.

The buyers are powerful if some of the following factors are present:

- Few customers
- Customers buying large volumes
- Focal company offering is standardised or undifferentiated
- Low customer switching costs
- Customer can produce the offering itself
- The customer is in an intermediary role

The buyers are price sensitive if some of these factors are present:

- Customer's earning profits are low
- Offering of low importance for the customer's product
- The price of the offering is a big share of the customer's total costs
- The price of the offering has no effect on the rest of the costs of the customer

A substitute is a product or service that completes the same task as the focal company's product or service. The **threat of substitutes** is the fourth force. The threat of substitutes might easily be overlooked, since the threat might be indirect or downstream from the focal company. (Porter, 2008) An example of a substitute could be a photovoltaic solar panel. When the solar panel first was commercialised in 1954 (Chodos, 2009), the incineration engine suppliers would have never thought of the solar panel as a threat. The efficiency of the solar panel at that time was about 6% (Chodos, 2009), being nowhere near able to produce enough electricity to meet the demand. However, the solar panels being developed today are expected to be able to achieve a conversion efficiency of 37% (Shieber, 2018), making it possible to use solar power to generate power commercially. Additionally, the price per generated power has decreased substantially over the last decade (see Figure B), and it seems that the

price still might drop. This, and the fact that the society becomes more conscious about how the emissions caused by incineration affects the planet, has put the incineration engine suppliers in a difficult position when many utilities and independent power plants substitute the engines with solar panels.

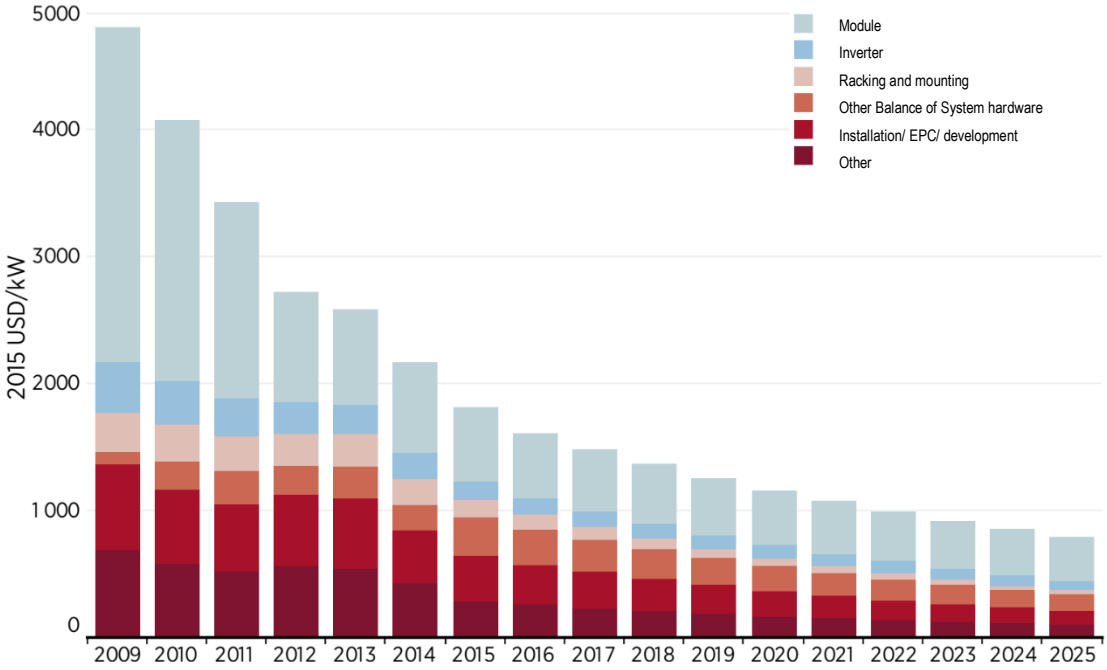

Figure B. Global weighted average cost for the total system of solar PV in utility scale projects (IRENA, 2016).

The profitability of a company suffers from a high threat of substitutes. There are two cases when the threat is tangibly high: first, if the price-performance ratio is better for the substitute than for the existing offering, and second, if the switching costs are low for the customer. (Porter, 2008) Low switching costs will lead to a situation where the customer compares the competitiveness of the products frequently, which means that the pricier offering suffers.

The threat of substitutes is high when

- The price-performance ratio is better for the substitute
- The switching costs are low for the buyer

The fifth, and probably the most familiar, competitive force is the **rivalry among existing competitors**. Usually we see this rivalry in the form of price discounting, new innovations and improvements to the product/service, and as advertising campaigns.

The effect of the rivalry depends on two factors; the *intensity* with which the rivals compete and on which *basis* they compete.

The intensity of rivalry is high if the competitors are equal in size and power. If the ecosystem growth is slow, the competition over market share will become fierce. Moreover, if the exit barriers are high it will also trigger the competition. Exit barriers might be, for example, manager attachment to the business. The competition also increases if there are several companies wanting to gain the leadership role of an ecosystem. (Porter, 2008)

The most devastating basis that the rivalry can originate from is the competition about prices. This rivalry will decrease the profitability for all competitors involved, transferring the created value to the customers. The price competition is most likely to occur if the competitors are very similar. Furthermore, if the fixed costs are high and other costs only marginal, the prices are almost impossible to disperse. If the products produced by the competitors are easily spoiled or perishable, like pastry or mobile phones that are constantly developed, the producer might want to cut the prices while the product still has value. (Porter, 2008)

If the competition is based on other grounds than the price, the result is usually favourable. Consider today's situation, when many companies compete in the ecological field, everyone endeavouring towards the greenest working process. This will favour both the society and the conscious customers, which might lead to a situation when the prices even can be increased. (Porter, 2008)

The degree of severity of the competition amongst existing rivals increase if

- Competitors are equal in size and power
- Ecosystem growth is slow
- High exit barriers
- Leader role is coveted
- Competitors are nearly identical
- High fixed cost, other costs marginal
- Perishable products